

COOLING TOWER SYSTEM AMENDMENT

Application for Certification (00-AFC-4) for Potrero Power Plant Unit 7 Project

July 2003

Prepared for:



Prepared by:



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ACRONYMS

µg/m ³	micrograms per cubic meter
AAQS	ambient air quality standards
AFC	Application for Certification
AQRVs	air quality related values
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BOD	biological oxygen demand
Cal/OSHA	California Occupational Safety and Health Administration
Cal-ARP	California Accidental Release Prevention
CARB	California Air Resources Board
CAS	Chemical Abstract Service
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	carbon monoxide
CTG	combustion turbine-generator
CWC	California Water Code
dB	decibels
dBA	A-weighted decibels
DF&G	Department of Fish and Game
DOC/ATC	Determination of Compliance/Authority to Construct
ERC	emission reduction credit
F&WS	Fish and Wildlife Service
FDOC	Final Determination of Compliance
g/s	grams per second
GAC	granular activated carbon
gpd	gallons per day
gpm	gallons per minute
HAPs	hazardous air pollutants
HRA	health risk assessment
HRSG	heat recovery steam generator
KOPs	Key Observation Points
LORS	laws, ordinances, regulations, and statutes
LOS	Level of Service
MBR	membrane bioreactor
mg/L	milligrams per liter
MW	megawatt
NMFS	National Marine Fisheries Service
NO _x	nitrogen oxides
NPDES	National Pollution Discharge Elimination System
O&M	operations and management
OSHA	Occupational Safety and Health Administration
PM ₁₀	particulate matter less than 10 micrometers in diameter
PM _{2.5}	particulate matter less than 2.5 micrometers in diameter
POC	precursor organic compounds
Potrero PP	Potrero Power Plant
ppm	parts per million
PSD	Prevention of Significant Deterioration

RWQCB	Regional Water Quality Control Board
SACTI	Seasonal Annual Cooling Tower Impact
SCR	Selective Catalytic Reduction
SEWPCP	Southeast Water Pollution Control Plant
SFFD	San Francisco Fire Department
SMIP	Site Mitigation and Implementation Plan
SO ₂	sulfur dioxide
STG	steam turbine-generator
SVP	Society of Vertebrate Paleontology
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
THI	total health index
TWA	time-weighted average
U.S. EPA	U.S. Environmental Protection Agency
USACE	U.S. Army Corps of Engineers
UV	ultraviolet
VOC	volatile organic compounds
VSOI	visual sphere of influence

1.0 EXECUTIVE SUMMARY

1.1 PROJECT OVERVIEW

An application to construct and operate a new 540 net megawatt (MW) generation unit, known as Unit 7, at the Potrero Power Plant (Potrero PP) in the City and County of San Francisco is before the California Energy Commission (CEC). The project, the site, and anticipated impacts have been described previously in Application for Certification (AFC) number 00-AFC-04. As used in this document, the term AFC refers to AFC number 00-AFC-04 and all subsequent filings related to that AFC. The AFC proposes a once-through cooling system for the Potrero PP, using water circulated from San Francisco Bay.

In its Final Staff Assessment, the CEC staff requested that Mirant undertake an engineering feasibility study of a cooling tower system as an alternative to the proposed once-through cooling system. The cooling tower design was found to be feasible from an engineering perspective. The economic feasibility of this option and the availability of effluent from the City of San Francisco have yet to be determined. This amendment to the AFC analyzes development of an upland cooling tower system using reclaimed water for cooling system makeup, as an alternative to the proposed once-through cooling system. The Applicant is requesting that the project be certified with both cooling system alternatives. The upland cooling system would consist of a wet/dry plume-abated cooling tower located on the Potrero PP site and associated on- and off-site facilities needed for supplying and treating secondary effluent from San Francisco's Southeast Water Pollution Control Plant (SEWPCP) for use as cooling water. If the Applicant were to elect the alternative cooling system, certain new facilities would be required and certain facilities associated with once-through cooling would be eliminated. This system, including the facilities listed above, is referred to in this amendment as the cooling tower system. The existing Unit 3 would continue to use the existing once-through cooling water system. Figures 1-1 and 1-2 show the location and an aerial overview of the proposed Potrero PP facility and the alternative cooling system using a wet/dry cooling tower.

1.2 FACILITY DESCRIPTION

The upland cooling tower system would consist of a wet/dry plume-abated cooling tower, an on-site recycled water treatment plant, on-site water storage in existing tanks, a pipeline for conveying secondary effluent from the SEWPCP to the Potrero PP site, pipelines for returning sludge and blowdown from the Potrero PP site to the SEWPCP, and the associated pumps, piping, and controls needed to operate the system.

The cooling tower would consist of 14 cells, each with wet and dry cooling components. These would be housed in a structure approximately 673 feet long, 62 feet wide, and 69 feet tall, located parallel to 23rd Street between existing Unit 3 and proposed Unit 7.

The recycled water treatment plant would be located within the Potrero PP site north of the cooling tower and west of Unit 3. It would consist of two membrane bioreactor (MBR) trains, each with an aeration tank and two membrane tanks; an ultraviolet (UV) disinfection system; pump stations for treated water, waste-activated sludge, and blowdown return; chemical feed; and odor control. This facility would be designed to treat 4.7 million gallons per day (mgd) of secondary effluent to tertiary recycled water standards. Two existing fuel tanks no longer required for fuel storage, No. 3 and 4, would be converted to storage tanks for the treated recycled water.

Off site, a pump station would be installed adjacent to the SEWPCP's Flynn Pump Station on Davidson Avenue near Rankin Street to pump secondary effluent from the SEWPCP to the Potrero PP water treatment plant. This secondary treated effluent would be taken from a 72-inch effluent sewer in Quint Street and conveyed in a new 18-inch pipeline to the Potrero PP. A 4-inch sludge line from the Potrero PP treatment plant and an 8-inch blowdown line from the cooling tower would provide return flows to the SEWPCP. The alignment of the pipelines would be underground in public rights-of-way.

Because the cooling tower and water treatment plant would occupy land previously reserved for construction material laydown, a new laydown area would be needed. Two nearby locations have been tentatively identified. These are Pier 80 at the east end of Cesar Chavez Street and Pier 96, off of Cargo Way. Most of the construction materials for the Unit 7 project would be delivered and stored at the laydown site, then brought to the construction site as needed. Although Pier 80 would be the preferred site, for the purposes of analysis, the more distant Pier 96 was considered the "worst case." The availability of either site has not been secured. If these properties cannot be made available, other suitable nearby sites would be used.

If the Applicant elected to construct the upland alternative, facilities needed for once-through cooling, but not needed for an upland cooling tower, would be eliminated from the project along with their potential associated construction and operations impacts if a wet/dry cooling tower system were developed. These include:

- Proposed Unit 7 cooling water intake structure;
- Trash rakes, fish screens, once-through circulating water pumps and motors, and all auxiliary equipment associated with the intake structure;

- Circulating water discharge piping with diffusers, from the steam turbine condenser outlet to the Bay; and
- Circulating water supply piping between the Unit 7 intake structure and the steam turbine condenser.

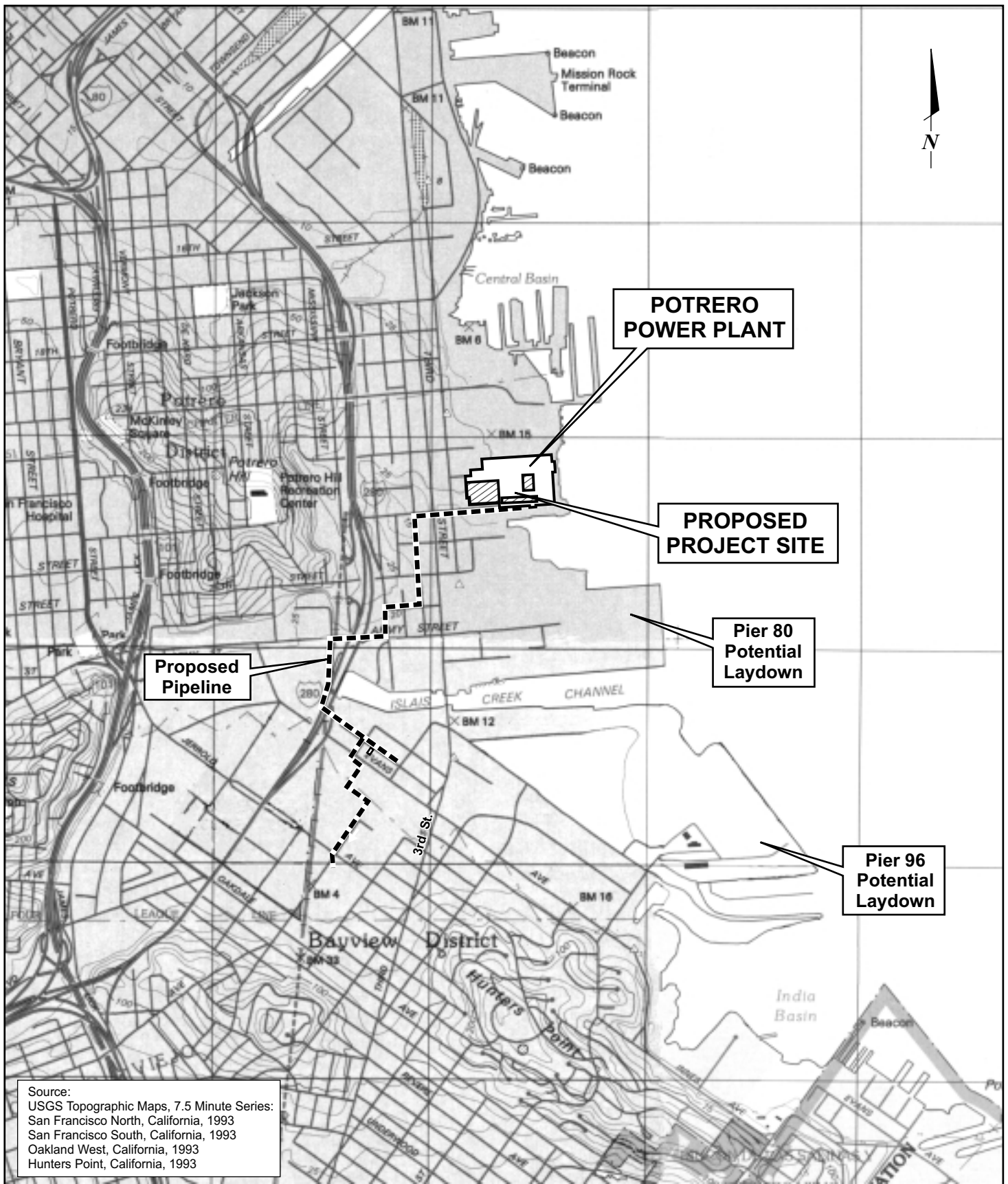
1.3 PROJECT SCHEDULE

The cooling system facilities would be constructed in tandem with the Unit 7 construction, which would be on a 24-month schedule. Within this schedule, the cooling tower would take 13 months to construct and the recycled water treatment plant 14 months. The pipeline and pump station would take approximately 8 months.

1.4 ENVIRONMENTAL CONSIDERATIONS

Under an upland cooling tower system, the benefits derived from replacing the existing Unit 3 once-through cooling system would not be realized.

The environmental impacts of the power generation project with once-through cooling have been presented in the AFC before the CEC. This amendment addresses only new or incremental impacts created by constructing the upland cooling tower system facilities. For many resources, there are no changes from the AFC analysis. Where there are changes, there were no significant impacts.



0 2000 4000

Scale in Feet
1:24,000

PROJECT VICINITY MAP

Cooling Tower System Amendment
Potrero Power Plant Unit 7 Project
Mirant Potrero LLC
San Francisco, California



28066634
July 2003

URS

FIGURE 1-1



**PROPOSED PROJECT
AERIAL PERSPECTIVE FROM NORTHWEST**

Cooling Tower System Amendment
Potrero Power Plant Unit 7 Project

Mirant Potrero LLC
San Francisco, California

28066634
July 2003



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FIGURE 1-2

**2.0 PROJECT
DESCRIPTION**

2.0 PROJECT DESCRIPTION

The Potrero Power Plant (PP) Unit 7 Project has been described previously in Application for Certification (AFC) number 00-AFC-04, currently before the CEC. As proposed in the AFC, the project includes a once-through cooling system using water circulated from San Francisco Bay.

Due to concerns regarding potential impacts of once-through cooling on Bay resources, Mirant was requested by the CEC to evaluate an upland cooling system for the Unit 7 project as an alternative to the proposed once-through system. This amendment to the AFC presents an upland cooling tower system as an alternative. It would use recycled water for cooling water makeup, and is an alternative to the proposed once-through cooling system using Bay water. The upland cooling system would consist of a wet/dry plume-abated cooling tower on the south side of the Potrero PP site and on- and off-site facilities necessary for supplying and treating secondary effluent from San Francisco's SEWPCP to use as cooling water. The Applicant is requesting that the project be certified with the once-through cooling system and the upland alternative described in this amendment.

2.1 EQUIPMENT

If the Applicant elected to construct the alternative cooling system, new upland cooling system facilities would be constructed and operated as part of the project and certain facilities associated with once-through cooling would not be constructed.

The environmental analyses provided in this amendment are intended to supplement and complement the work completed in the AFC. To this end, extensive descriptive material provided in the AFC is not repeated here. Likewise, analyses of project features that would be unaffected by a change from once-through cooling to an upland cooling system are not included.

2.1.1 EQUIPMENT DIFFERENCES BETWEEN ONCE-THROUGH COOLING AND WET/DRY COOLING TOWER SYSTEMS

A wet/dry plume-abated cooling tower system for the Potrero PP Unit 7 steam turbine condenser will require additional equipment to be added and constructed on the existing plant site. The major components associated with the wet/dry cooling tower system include:

- Wet/dry tower and basin
- Associated mechanical equipment, including:
 - Circulating water pumps designed for wet/dry cooling tower

- Acid feed system, including storage tank, pumps, and pipes
 - Scale and corrosion inhibitor chemical feed system, including storage tank, pumps, and pipes
 - Sodium hypochlorite feed system, including storage tank, pumps, and pipes
- Pump station and pipeline to convey secondary effluent water from the SEWPCP
- A fiber optic cable between the Potrero PP and the pump station at the SEWPCP.
- Pump stations and pipelines to convey return blowdown and sludge water to the SEWPCP
- Recycled water treatment plant at the Potrero PP, including:
 - Two membrane bioreactor (MBR) trains, each with an aeration tank and two membrane tanks
 - UV disinfection system
 - Membrane re-circulation pumps
 - Aeration basin blowers
 - Filtration pumps
 - Odor control system
 - Alum storage tanks
 - Sodium hydroxide storage tanks
 - Sodium hypochlorite storage bins
 - Treated water pump station
 - Sludge pump station
- Existing fuel tanks converted for recycled water storage

In addition, temporary laydown space would likely be required off site because the wet/dry tower and recycled water treatment plant would occupy land previously designated for the laydown of construction materials during the Unit 7 construction. Two nearby locations have been tentatively identified: Pier 80 at the east end of Cesar Chavez Street and Pier 96, off of Cargo Way. The availability of either site has not been secured. If these properties cannot be made available another suitable nearby site would be used. Although Pier 80 would be the preferred site, for purposes of this analysis, the more distant Pier 96 was used.

With a change from a once-through cooling system to a wet/dry cooling tower system, certain components associated with the once-through system, which were described in the AFC, would be eliminated. These items include:

- New Unit 7 cooling water intake structure

- Trash rakes, fish screens, once-through circulating water pumps and motors, and all auxiliary equipment associated with the proposed once-through intake structure.
- Circulating water discharge piping with diffusers, from steam turbine condenser outlet to Bay
- Circulating water supply piping between the Unit 7 intake structure and steam turbine condenser

2.1.2 ECONOMIC DIFFERENCE BETWEEN ONCE-THROUGH COOLING AND WET/DRY COOLING TOWER SYSTEMS

A change from a once-through cooling system to a wet/dry cooling tower system would increase the capital and operation and maintenance (O&M) costs for the project. Table 2-1, Capital and O&M Cost Table, provides the estimated capital costs for each of the two systems. The wet-dry cooling tower system would have a total increased cost of approximately \$41.8 million over the life of the project, compared to the project with once-through cooling. This represents an increase of approximately 75 percent.

2.2 WET/DRY COOLING TOWER SYSTEM DESCRIPTION, DESIGN, AND OPERATION

2.2.1 SITE PLAN AND ACCESS

A site plan with the new wet/dry cooling tower system and related facilities located on the Potrero PP property is shown in Figure 2-1. This plan also shows the existing Unit 3 steam turbine unit, the existing Units 4, 5, and 6 combustion turbine peaking units, and the proposed Unit 7. Unit 7 would consist of two combustion turbine-generator (CTG) and heat recovery steam generator (HRSG) trains and a single steam turbine-generator (STG). On-site facilities related to the cooling system include the wet/dry cooling tower, a recycled water treatment plant, two existing tanks for recycled water storage, and associated piping and pumps. Access to the Potrero PP site would be via Illinois Street and 23rd Street, which border the west and south sides of the site. General access to the area for construction materials and workers is provided by I-280, approximately five blocks from the project site.

Off-site facilities include water piping and a fiber optic cable between the Potrero PP and a pump station at the SEWPCP. The off-site facilities are shown in Figure 2-2. Access for off site pipeline and pump station construction would be along the existing roads under which the pipeline would be constructed.

Installing a wet/dry tower and water treatment plant on the Potrero PP site would require the use of on-site land previously designated as a laydown area in support of the Unit 7 construction. This change in land use likely creates a need for an alternate off site laydown area for marshalling construction materials. The laydown area could be on vacant land available on Pier 96, approximately 1.7 miles from the Potrero PP site via public roads, or Pier 80, near the Potrero PP site. These areas are shown in Figure 1-1.

Pier 96 is at the east end of Cargo Way, south of Islais Creek. Approximately 10 acres are available. Access between the laydown area and the Potrero PP site would require use of Cargo Way, 3rd Street, 23rd Street, and Illinois Street. If it is constructed in time, a new Illinois Street bridge across Islais Creek could provide an alternate transportation route.

At Pier 80, where approximately 7 acres are available, the distance to the Potrero PP site is approximately 0.5 mile. Access between the alternative Pier 80 laydown area and the Potrero PP site would be via 27th Street, 3rd Street, and 23rd Street. Neither the Pier 80 or Pier 96 site is currently under agreement for lease as a laydown area. However, for purposes of analysis, it is assumed that the more distant laydown site at Pier 96 would be used.

An aerial perspective of the proposed cooling tower system is shown in Figure 1-2. Elevation views of the wet/dry tower cooling system elements at the Potrero PP site are shown in Figure 2-3. Permanent off site facilities would be underground, except a small pump station adjacent to the SEWPCP's Flynn Pump Station.

2.2.2 WET/DRY COOLING TOWER

A closed-cycle wet/dry mechanical draft tower dedicated to Unit 7 would be constructed. A circulating water pump basin would be built near the west end of the wet/dry tower. The pump basin would be approximately 63 feet by 35 feet and would house two 50 percent capacity circulating water pumps. Cooling water would be pumped from the basin to the steam turbine condenser. The cooling water would remove heat from the steam turbine exhaust, condensing the steam to water for reuse in the power plant. A second, side stream of cooling water would pass through a heat exchanger to cool auxiliary equipment in the plant. The heated cooling water leaving the condenser and the heat exchanger would pass to distribution headers located in the cooling tower. This system of distribution headers is located above heat transfer surfaces (called "fill" sections) within the wet/dry tower. The fill sections comprise the wet section of the wet/dry tower. When needed, the distribution headers also are able to supply a portion of the heated cooling water to tube heat exchangers located above the wet section of the tower. These tube heat exchangers comprise the dry section of the wet/dry tower.

In the wet section of the tower, water from the distribution headers flows as droplets downward through the fill section while fans draw (induce) air upward. This results in heat transfer through both evaporation and convection. Cooling occurs primarily by evaporation in the wet section of the tower. The wet section of the tower operates whenever Unit 7 is in service. The dry section operates only during times of the year when ambient humidity or temperature conditions are such that there is a potential to create a visible plume. When needed for plume abatement, a portion of the hot circulating water from the condenser is routed through a series of tube heat exchangers in the dry section. Here the outside surface of the heat exchangers is exposed to the moisture-laden air rising from the wet section. The moisture-laden air exiting the cooling tower is prevented from becoming supersaturated, thereby eliminating the presence of a visible plume. This is effective within the plume abatement design points of 90 percent relative humidity and an ambient air temperature of 29 °F.

Temperature and flow data for the wet/dry tower at various ambient conditions can be found in Table 2-2, Energy Balance, and Figure 2-4.

The layout of the wet/dry tower is shown on Figure 2-1. The wet/dry tower would consist of 14 cells and measure approximately 62 feet wide by 673 feet long by 69 feet tall. As shown on the site plan, the tower would be parallel to and approximately 30 feet from the nearest part of the south property line. To reduce off-site noise, the wet/dry tower will have an air flow inlet on only one side of the tower, the north side. The south side of the tower will be a solid wall designed to act as a noise barrier, to insure that the noise standard of 75 dBA at the property line is met. The noise level along the south side of the tower is estimated to be 74 dBA at 30 feet. The one-sided wet/dry tower would be slightly taller and longer than a comparable two-sided air inlet tower used in a similar application.

The water source for the wet/dry tower would be secondary effluent from the SEWPCP. The secondary effluent would be treated on the Potrero PP site by a new recycled water treatment plant, discussed below. The treated water would then be pumped either directly to the wet/dry tower or to recycled water storage tanks. Water lost to evaporation, drift, and blowdown during the cooling process would be made up by inflow from the recycled water treatment plant or the storage tanks. Blowdown is necessary to maintain the concentrations of background water contaminants at acceptable operating levels.

Water flows associated with the wet/dry cooling tower system are given in Table 2-3, Unit 7 Water Balance/Flow, and Figure 2-5.

Should the Applicant elect the alternative cooling system, the wet/dry cooling tower system would replace the proposed once-through cooling system. As outlined in Section 2.1, this

change would mean that the new Unit 7 cooling water intake structure and associated pumps, fish screens, trash rakes and ancillary equipment would no longer be needed. The discharge pipes and diffusers into the bay would be eliminated, as well. Also, the routing of the circulating water supply and discharge piping would be considerably shorter since it would now come from the west end of the wet/dry tower instead of coming from the Bay shoreline area. An existing once-through cooling system for Unit 3 would continue to be used. Whereas the once-through cooling proposed in the AFC would have provided cooling for both Unit 3 and Unit 7, the cooling tower would be dedicated to Unit 7 alone.

Construction of the wet/dry tower would also require the demolition of some existing structures and the relocation of associated equipment. The affected facilities include the following:

- Sewer Lift Station
- Abrasive Blast Building
- Paint Shop
- Welding/Electrical Shop

In addition, a warehouse and some mobile trailers onsite may need to be relocated during the construction period to allow for construction equipment maneuverability and potential onsite laydown.

The estimated time for constructing the wet/dry cooling tower is 13 months, which includes time for mobilization, basin installation, tower erection, and mechanical and electrical equipment installation and hook-up.

2.2.3 MAKEUP WATER SUPPLY

The makeup water supply for the wet/dry tower would be treated secondary effluent pumped from the SEWPCP via a pipeline. A new 18-inch-diameter pipeline would convey approximately 4.7 million gallons per day (mgd) of effluent to the Potrero PP site, where it would be further treated at a new on-site recycled water treatment plant. The water would then be pumped to the wet/dry tower or temporarily stored in existing tanks for use as make-up water to the wet/dry tower. Blowdown from the wet/dry tower would be returned to the SEWPCP in an 8-inch-diameter pipeline. The sludge from the recycled water treatment process would also be returned to the SEWPCP in a separate 4-inch-diameter pipeline.

2.2.4 NEW RECYCLED WATER FACILITIES

The major components associated with providing makeup water to the wet/dry tower consist of:

- A pump station and an 18-inch pipeline to convey secondary effluent from San Francisco's SEWPCP to the Potrero PP;
- A recycled water treatment plant at the Potrero PP designed to treat approximately 4.7 mgd of secondary effluent to tertiary recycled water standards;
- A pump station and pipeline at the Potrero PP to convey treated water from the recycled water treatment plant to two existing on-site tanks converted from fuel to water storage;
- A pump station and 4-inch pipeline at the Potrero PP to convey waste activated solids (sludge) produced by the treatment process from the Potrero PP to the solids thickening facility at the SEWPCP;
- An 8-inch pipeline to convey blowdown from the cooling process to the influent sewer at the SEWPCP; and
- A fiber optic cable between the Potrero PP and the pump station at the SEWPCP.

2.2.5 SECONDARY EFFLUENT PUMP STATION

A secondary effluent pump station with three 25 HP vertical turbine pumps would be installed in an area near the Flynn Pump Station, which is located adjacent to the SEWPCP. The pump station would be enclosed and would occupy a rectangular pad approximately 10 by 24 feet. The new pumps would convey secondary effluent from the SEWPCP to the recycled water treatment plant at the Potrero PP, via a new 18-inch pipeline. Under normal conditions, two pumps would operate and the third would provide standby redundancy. A self-cleaning strainer would be provided in the discharge header to remove particles greater than 2 mm in size.

2.2.6 PROPOSED PIPELINE ROUTE

Secondary effluent would be conveyed from the SEWPCP to the Potrero PP site in a new 18-inch pipeline. The pipeline alignment is shown on Figure 2-2. This pipeline would begin

at an existing 72-inch-diameter secondary effluent line located under Quint Street that runs from the SEWPCP to a pump station located on Quint Street adjacent to Islais Creek. The new 18-inch pipeline would convey secondary effluent west along the south side of Davidson Street to a new pump station (described above) to be installed in the lot immediately east of the existing SEWPCP Flynn Pump Station, which is located on the southeast corner of Rankin Street and Davidson Avenue. From the new pump station, the 18-inch pipeline would continue along the south side of Davidson Avenue to Rankin Street. From there, the pipeline would be installed within an existing sewer overflow transport between Rankin Street and the intersection of Cesar Chavez Street and Indiana Street. The overflow transport is a large underground box culvert structure that varies in width from 10 to 20 feet and in depth from 28 to 38 feet. The portion of this structure to be used for installation of the new pipelines extends from Rankin Street west along Davidson Avenue, passes under I-280 and the adjacent railroad, turns north along the west side of the railroad to Cesar Chavez, then east along Cesar Chavez to Indiana Street. The new pipelines and a fiber optic cable would be installed atop an existing encased 30-inch pipe. The new pipes would be anchored and encased, as well.

From where it exits the overflow transport at the intersection of Cesar Chavez and Indiana Street, the alignment would continue as follows:

- north along the east side of Indiana Street to 26th Street,
- east along the south side of 26th Street to Tennessee Street,
- north along the east side of Tennessee Street to 23rd Street, and then
- east along the south side of 23rd Street to the Potrero PP site adjacent to 23rd Street.

Return flows from the Potrero PP to the SEWPCP would parallel much of the same supply pipeline route. Specifically, the new 18-inch effluent, 8-inch blowdown, and the 4-inch sludge lines, as well as the fiber optic cable, would share a common alignment between the intersection of Davidson Avenue and Rankin Street and the Potrero Power Plant site. These lines diverge at the intersection of Davidson Avenue and Rankin Street. The fiber optic cable continues on Davidson Avenue in the 18-inch effluent line alignment to the new pump station beside the SEWPCP's Flynn Pump Station. The two return flow lines (8-inch blowdown line and 4-inch sludge line) follow Rankin Street south approximately 250 feet to Evans Avenue, where the blowdown line connects to an existing 72-inch influent sewer line delivering raw sewage to the SEWPCP. From Evans Avenue, the 4-inch sludge line continues within the SEWPCP approximately 1,950 feet to the sludge thickeners located near Quint Street and Jerrold Avenue. Within the SEWPCP, the 4-inch sludge line would be installed in existing pipe galleries and concrete pipe trenches.

2.2.7 ON-SITE RECYCLED WATER TREATMENT AND STORAGE FACILITIES

The recycled water treatment facilities to be developed on the Potrero PP site would be designed to treat up to 4.7 mgd of secondary effluent to meet CCR Title 22 “disinfected recycled water” standards. The facility would also be designed to reduce ammonia and phosphorus concentrations to improve operability of the cooling process at Unit 7. The recycled water treatment and storage facilities are shown in Figure 2-1. Elevation views of the facilities are shown in Figure 2-3.

Secondary effluent delivered to the site via the 18-inch effluent pipeline would enter a flash mixer and be injected with aluminum sulfate (alum) to bind phosphorus and sodium hydroxide to maintain a set pH. The effluent would be introduced into the reactor tank to coagulate phosphorus and oxidize ammonia and biochemical oxygen demand (BOD), and then flow to MBD tanks housing an immersed membrane filtration system to remove suspended solids. Waste activated solids (sludge) from this process would be pumped from the aeration tanks to the SEWPCP’s existing thickeners by way of the 4-inch sludge line. The filtered water would flow to the UV system unit for disinfection. Following the UV disinfection process, sodium hypochlorite would be added to the water to provide a chlorine residual in the treated water. Following UV disinfection, the treated water pump station would convey treated water to storage tanks.

Two of the three existing fuel storage tanks on-site would be converted into recycled water storage tanks (tanks No. 3 and 4). The third tank would remain as a fuel tank. The converted tanks would be refurbished prior to use as water storage tanks. Piping and pumps would be installed to convey treated water from the water storage tanks to the wet/dry tower.

Blowdown from the wet/dry tower would be returned in an 8-inch blowdown pipeline to the influent sewer at the SEWPCP.

Three chemicals would be injected into the process stream at three locations within the treatment facility. Aluminum sulfate (alum) and sodium hydroxide (caustic soda) would be injected upstream of the MBR system, and sodium hypochlorite would be injected before the treated water enters the treated water storage tanks. Sodium hypochlorite would also be delivered to the membrane cleaning process in the MBR system. Each chemical feed system would include two bulk chemical storage tanks (or tote bins in the case of sodium hypochlorite) and chemical metering pumps to deliver chemicals to the application points. Chemical storage tanks would be installed inside secondary containment basins sized to contain the contents of the largest tank plus an allowance for rainfall and freeboard.

All treatment processes would be covered to minimize the potential for odors. Air drawn from inside the covers would be vented through a granular activated carbon system for odor removal. Aeration basins, membrane tanks, and backwash tanks for the MBR system would be covered and vented through the odor abatement system.

All structures would be supported on end bearing piles ranging in length from 10 to 40 feet. The membrane bioreactor is a partially buried concrete structure with two aeration basins and four membrane basins. The aeration basins are 34 feet long by 16 feet wide, the membrane basins are 16 feet wide by 30 feet long. The disinfection system basin is a partially buried concrete structure 8 feet deep, 7 feet wide, and 30 feet long. Various lightweight tanks, structures, and equipment would be founded on pile-supported concrete slabs.

The proposed recycled water treatment plant would be located on 0.6 acre within the Potrero PP site. The construction period is estimated to be 14 months.

2.2.8 CONSTRUCTION

2.2.8.1 Construction Site Remediation

Portions of the Potrero PP site are known to have contaminated soils and groundwater as a result of previous site use. The AFC addresses the extent of known contamination and provides a Site Mitigation and Implementation Plan (SMIP) that will guide the site preparation phase. The SMIP would be updated for approval by the CCSF Department of Public Health prior to obtaining a building permit. The update would include those portions of the site not previously included, but which would now be included as a result of construction of the wet/dry cooling tower and the recycled water treatment plant. The SMIP includes procedures for classifying excavated materials to determine the degree and type of contamination and procedures for management and disposal of contaminated materials. The SMIP is a prerequisite for obtaining a building permit for the project.

2.2.8.2 Onsite Construction

Onsite construction requirements and techniques are discussed in the AFC and apply to the upland cooling tower system.

Site Preparation. For the upland cooling tower system, onsite construction would include:

- Wet/dry cooling tower
- Recycled water treatment plant
- Pipes and pumps

Foundation work would be required for these facilities. The larger facilities would be on pile-supported foundations. Some basins or concrete tanks would be partially below grade. All excavation and grading would conform with the requirements of the SMIP to ensure any contaminated soil is managed and disposed of properly. Any water withdrawn from excavations as part of construction would be treated, if required, and disposed of in an approved manner.

Construction Workforce. The projected monthly construction labor for the entire project is shown in Table 8.8-1. This includes construction of Unit 7, the cooling tower, the recycled water treatment plant, and offsite facilities. The labor that would have been required for the once-through cooling system is omitted. A projected peak of 363 construction personnel would occur in month 14. By comparison, for the once-through cooling system, the peak was estimated at 287. The average number of personnel for the 24-month construction period is 173 per month.

Estimated Construction Cost. The estimated additional construction cost for the upland cooling tower system is \$19 million dollars. The construction and operations and maintenance costs for the two systems are shown in Table 2-1.

Construction Traffic. Construction traffic from the construction workforce is projected to increase by about 88 trips during AM and PM peak hours over traffic attributable to the once-through cooling system workforce.

Construction Equipment. Construction equipment that would be used onsite to construct the upland cooling tower system is somewhat less than the amount of construction equipment that would have been required for the once-through cooling system.

2.2.9 PIPELINE CONSTRUCTION

Open trench construction would be required to install certain sections of the pipelines. Other sections would be installed within the existing overflow transport or within existing concrete pipe trenches or galleries. Construction techniques by segment are indicated in Table 2-4.

Open trench work would involve conventional trench excavation and backfill within the street routes. Where trenching occurs, it is expected that the three pipes can be installed in a relatively shallow trench with a total excavation depth of approximately 7 feet. The trench would be approximately 5 feet wide, to allow clearance on both sides of the pipe for shoring and sheeting. The 18-inch-diameter pipe would be installed at the bottom of the trench, with the 8-inch and 4-inch pipes and the fiber optic line positioned above. This configuration provides a narrow trench configuration within the street. It is anticipated that the excavated

material is unsuitable for backfill and would be hauled to an appropriate disposal site. An estimated 6,100 cubic yards of material would be removed.

In trench locations, the roadway surface would be restored in accordance with the City and County of San Francisco Bureau of Engineering's Standard Plans. These plans require a 1.5-inch layer of asphalt concrete over an 8-inch layer of Portland cement concrete. The plans also require the pavement to be sawcut and removed a minimum of 1 foot on either side of the trench. The length of trench open at any one time is regulated by City ordinance. Open trenches would be covered or filled during non-work periods.

For crossing large existing facilities (such as box culverts and the future light rail tracks), tunneling methods such as either jack and bore or microtunneling would be used. Both of these trenchless methods would require a jacking pit and a receiving pit. The jacking pit would be approximately 30 feet long and 15 feet wide. A casing pipe would be installed by either jack and bore or micro-tunneling at these crossings. The pipes and fiber optic cable would be bundled with spacers and skids then pushed through the empty casing. Excess material from the operation may be contaminated, and would be hauled to an appropriate disposal site.

Installing the pipe within the existing sewer overflow transport (box culvert) would require no new trenching. Where the pipes and fiber optic cable are installed in the sewer overflow, they would be anchored and concrete encased. Installation within the overflow transport requires safety procedures specific to work within a confined space. Prior to work within the structure, discharge locations into the overflow would be identified. Temporary barriers would be constructed at all inlets to prevent inflow during the work. The structure would be pressure washed and ventilated, and temporary lighting installed. Access holes would be cut into the top of the structure near bends in the alignment so that equipment and materials could be lowered into it. At these locations, temporary stair towers would also be put in place to provide access for construction workers. It is anticipated that fusion welding of the pipe would be done inside the overflow transport.

Construction of the pipeline, pipeline appurtenances, and pump station is expected to take approximately 8 months. The casing under 3rd Street may be installed during 3rd Street light rail construction.

2.2.10 TRAFFIC CONTROL DURING OFF-SITE CONSTRUCTION

Street traffic in the pipeline area is comprised mostly of industrial traffic. All streets are used for local traffic. Through-traffic uses primarily Evans Avenue, Cesar Chavez Street, and 3rd Street. The streets where trenching methods are proposed are wide. During pipeline installation, parking will likely have to be suspended in areas where the work is occurring.

Access to businesses in the area would be maintained during the workday. Because the streets in the area occur in a tight grid pattern, any detours needed would be modest in length. Use of barriers, signals, flagmen, and other traffic safety measures would be in accordance with City requirements.

Table 2-1 Comparison of Cooling System Costs (Cost in \$1,000s)				
Alternative	Initial Capital Cost (Equipment + Installation)	O & M (Equivalent Capital Cost over plant life) ⁽¹⁾	Additional Cost Impacts ⁽²⁾	Total Cost
Once-through Cooling System	55,105	5,750	Base	60,855
Wet/Dry Cooling System	74,029	19,990	8,600	102,619
Additional Cost of Wet/Dry Cooling System	18,924	14,240	8,600	41,764
Notes: (1) Equivalent Capital Cost is the future stream of annual O&M (inflated) dollars over the anticipated plant life discounted to current (present value) dollars for purposes of comparison. (2) Equivalent Capital Cost over plant life, above once-through cooling system cost, includes the economic impact due to O&M, replacement energy, heat rate difference, and capacity.				

No. ^a	Load Stream	ISO ^b			Summer ^c			Winter ^d		
		deg.F	psia	lb/hr	deg.F	psia	lb/hr	deg.F	psia	lb/hr
1	NG to Unit No.1	60	200	99,100	60	200	96,500	60	200	93,100
2	NG to Unit No.2	60	200	99,100	60	200	96,500	60	200	93,100
3	NG to CT-1	355	470	83,600	355	470	81,100	355	470	81,700
4	NG to CT-2	355	470	83,600	355	470	81,100	355	470	81,700
5	NG to Duct Burner - 1	60	200	15,500	60	200	15,400	60	200	11,400
6	NG to Duct Burner - 2	60	200	15,500	60	200	15,400	60	200	11,400
7	CT Exhaust to HRSG - 1	1,102	15.2	3,753,000	1,116	15.2	3,643,000	1,095	15.2	3,755,000
8	CT Exhaust to HRSG - 2	1,102	15.2	3,753,000	1,116	15.2	3,643,000	1,095	15.2	3,755,000
9	Injection Steam to CT - 1	512	390	128,000	512	390	124,300	941	497	0
10	Injection Steam to CT - 2	512	390	128,000	512	390	124,300	941	497	0
11	HP Steam - 1 to ST	1,044	2,022	621,000	1,054	2,022	618,000	1,024	2,022	627,000
12	HP Steam - 2 to ST	1,044	2,022	621,000	1,054	2,022	618,000	1,024	2,022	627,000
13	HP Steam to ST	1,039	1,945	1,242,000	1,049	1,945	1,237,000	1,018	1,945	1,254,000
14	Reheat to HRSG - 1	675	488	606,000	683	489	603,000	659	492	612,000
15	Reheat to HRSG - 2	675	488	606,000	683	489	603,000	659	492	612,000
16	RH Steam - 1 to ST	1,048	478	637,000	1,054	479	637,000	1,023	482	649,000
17	RH Steam - 2 to ST	1,048	478	637,000	1,054	479	637,000	1,023	482	649,000
18	RH Steam to ST	1,043	464	1,274,000	1,049	465	1,274,000	1,018	468	1,298,000
19	LP Adm Steam - 1 to ST	505	73	31,200	504	73	29,700	506	76	45,600
20	LP Adm Steam - 2 to ST	505	73	31,200	504	73	29,700	506	76	45,600
21	LP Adm Steam to ST	505	73	62,400	504	73	59,400	506	76	91,200
22	Steam to Condenser	102	1.02	1,366,000	109	1.23	1,363,000	96	0.85	1,419,000
23	Boiler Feedwater to HRSG-1	96	106	815,000	102	106	809,000	97	108	713,000
24	Boiler Feedwater to HRSG-2	96	106	815,000	102	106	809,000	97	108	713,000
25	Blowdown HRSG - 1	na	na	0	na	na	0	na	na	0
26	Blowdown HRSG - 2	na	na	0	na	na	0	na	na	0
27	CW to Dry Tower Section	0	na	0	0	na	0	0	na	0
28	CW to Wet Tower Section	0	na	0	0	na	0	0	na	0
29	CW to Condenser	0	na	0	0	na	0	0	0	0
30	Exhaust HRSG - 1	0	0.0	0	0	0.0	0	0	0.0	0
31	Exhaust HRSG - 2	0	0.0	0	0	0.0	0	0	0.0	0

Notes

^a Numbers correspond to the load stream as shown on Figure 2-4.

^b ISO - 59 deg.F (Supplemental firing and power augmentation)

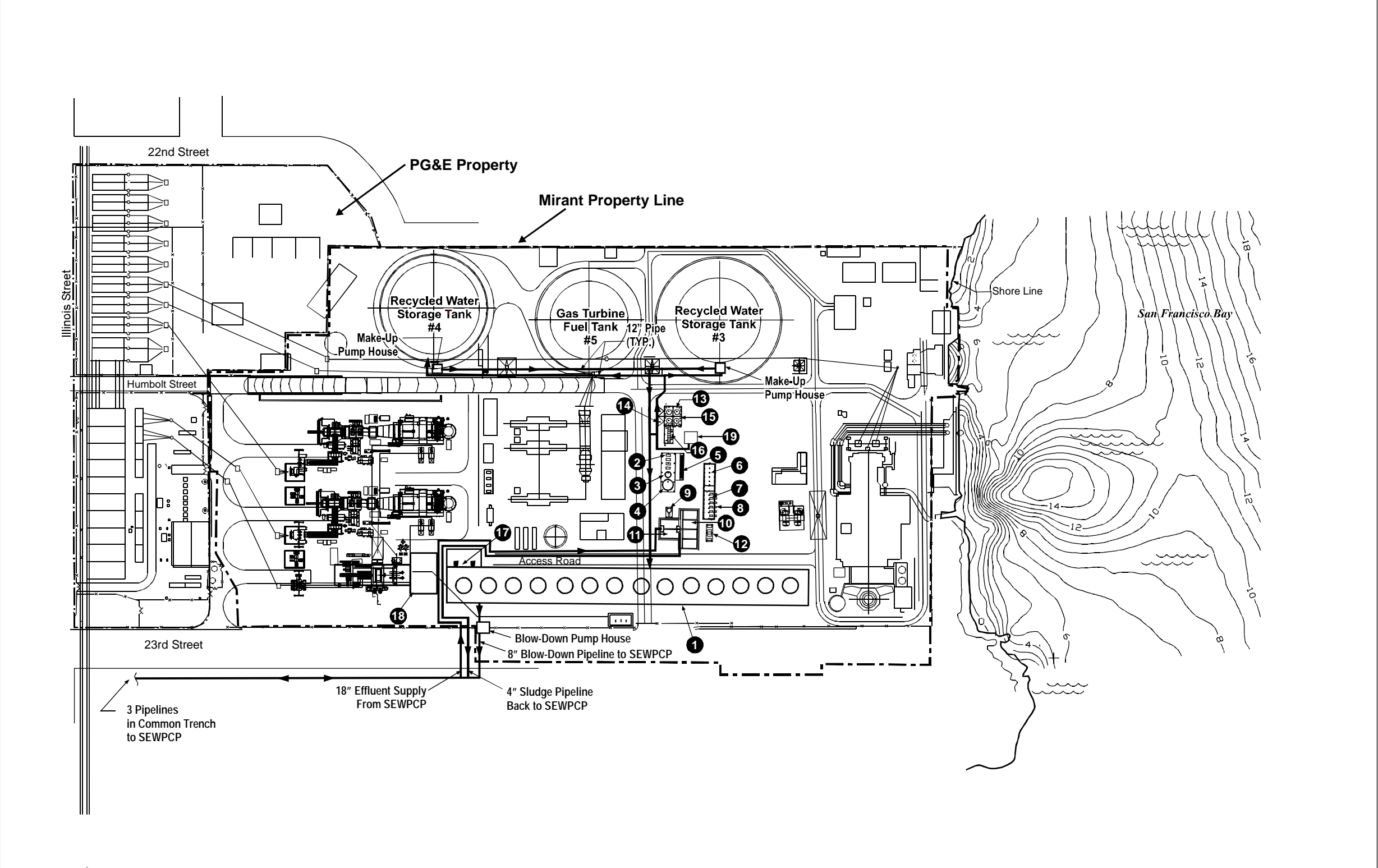
^c Summer - 80 deg.F (Supplemental firing and power augmentation)

^d Winter - 35 deg.F (Supplemental firing only)

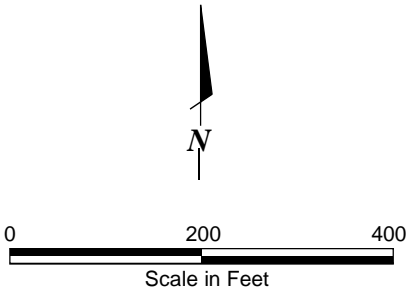
Table 2-3 Unit 7 Water Balance/Flow (gpm) Alternative Cooling With Wet/Dry Cooling Tower in Place of Once Through System							
No. (a)	Source / Use	Case 1 - Average Full Load		Case 2 - Summer w/ Evap		Case 3 - Summer w/ Evap., SF, PA	
		Avg./Day 24 hr avg.	Max. / Day	Avg./Day 24 hr avg.	Max. / Day	Avg./Day 24 hr avg.	Max. / Day
1	Rain Water	3.74	500.00	3.74	500.00	3.74	500.00
2	Combined Cycle Storm Water Runoff to SF Bay	3.74	500.00	3.74	500.00	3.74	500.00
5	San Francisco City Water Supply	24.24	320.00	74.24	420.00	182.24	420.00
6	City Water for Domestic Use	1.04	20.00	1.04	20.00	1.04	20.00
7	Waste from Toilets, Sinks etc. to Septic Tank	1.04	20.00	1.04	20.00	1.04	20.00
8	Boiler Chemical Cleaning Waste	0.00	0.00	0.00	0.00	0.00	0.00
9	Total to City Sewer	1.25	290.00	1.25	290.00	1.25	290.00
10	City Water to Auxiliaries	23.20	300.00	73.20	400.00	181.20	400.00
11	City Water to HRSGs Demineralizer Trailer	0.00	0.00	0.00	0.00	0.00	0.00
12	City Water to Demineralizer Building	0.00	0.00	0.00	0.00	0.00	0.00
13	City Water to HRSG A	0.00	0.00	0.00	0.00	0.00	0.00
14	City Water to HRSG B	0.00	0.00	0.00	0.00	0.00	0.00
16	City Water to Evaporative Coolers	0.00	0.00	50.00	100.00	50.00	100.00
17	City Water to Evaporative Cooler B	0.00	0.00	25.00	50.00	25.00	50.00
18	Evaporative Cooler B - Evaporation	0.00	0.00	18.75	37.50	18.75	37.50
19	City Water to Evaporative Cooler A	0.00	0.00	25.00	50.00	25.00	50.00
20	Evaporative Cooler A - Evaporation	0.00	0.00	18.75	37.50	18.75	37.50
25	PA Steam from HRSG A to CTs (shown in gpm)	0.00	0.00	0.00	0.00	54.00	227.00
26	PA Steam from HRSG A to CTs (shown in gpm)	0.00	0.00	0.00	0.00	54.00	227.00
27 (b)	HRSG A Cleaning Waste	0.00	0.00	0.00	0.00	0.00	0.00
28 (b)	HRSG B Cleaning Waste	0.00	0.00	0.00	0.00	0.00	0.00
29 (b)	HRSG Cleaning Waste to Offsite Disposal	0.00	0.00	0.00	0.00	0.00	0.00
30	Makeup Water to the Demineralizer	23.20	300.00	23.20	300.00	131.20	300.00
33	Demineralized Water to CST	23.20	300.00	23.20	300.00	131.20	300.00
40	Condensate to CTs	1.20	162.00	1.20	162.00	1.20	162.00
41	CT B Off-Line/On-Line Wash Water	0.60	81.00	0.60	81.00	0.60	81.00
42	CT B Off Line Wash Water to Storage Tank	0.60	81.00	0.60	81.00	0.60	81.00
43	CT A Off-Line/On-Line Wash Water	0.60	81.00	0.60	81.00	0.60	81.00
44	CT A Off Line Wash Water to Storage Tank	0.60	81.00	0.60	81.00	0.60	81.00
45	Off-Line Wash Water to Offsite Disposal (c)	0.12	0.00	0.12	0.00	0.12	0.00
46	Condensate Makeup to HRSGs	22.00	76.00	22.00	76.00	130.00	530.00
47	Condensate Makeup to HRSG A	11.00	38.00	11.00	38.00	65.00	265.00
48	HRSG A Boiler water samples to Water Analysis	5.00	5.00	5.00	5.00	5.00	5.00
49	Condensate Make-Up to HRSG B	11.00	38.00	11.00	38.00	65.00	265.00
50	HRSG B boiler water samples to Water Analysis	5.00	5.00	5.00	5.00	5.00	5.00
51	Boiler Water sample drains	10.00	10.00	10.00	10.00	10.00	10.00
53	Rain Water collected in the CT Enclosure	(d)	(d)				
54	Rain Water collected in the HRSG Area	0.23	250.00	0.23	250.00	0.23	250.00
60	Floor Drains from the Demineralizer	0.00	0.00	0.00	0.00	0.00	0.00
61	Drains from Fire Protection Pump Room	0.00	0.00	0.00	0.00	0.00	0.00
62	Floor Drains from Turbine/CT Area	0.00	10.00	0.00	10.00	0.00	10.00
63	Drain Header	0.00	10.00	0.00	10.00	0.00	10.00
64	Drains from HRSG Area	0.23	250.00	0.23	250.00	0.23	250.00
65	Floor Drains from Turbine Enclosure	0.00	10.00	0.00	10.00	0.00	10.00
66	Drain Header	0.23	270.00	0.23	270.00	0.23	270.00
67	Combined Cycle Waste from Oil Water Seperator	0.21	270.00	0.21	270.00	0.21	270.00
68	Sludge from Oil Water Separator (OWS) (c)	0.02	50.00	0.02	50.00	0.02	50.00
70	HRSG B Blowdown	6.00	34.00	6.00	34.00	6.00	34.00
71	HRSG A Blowdown	6.00	34.00	6.00	34.00	6.00	34.00
72	Total Blowdown from HRSGs	12.00	68.00	12.00	68.00	12.00	68.00
73	Clean Drains - Turbine Boiler Building	22.00	76.00	22.00	76.00	22.00	76.00
76	Blowdown from Evaporative Cooler A	0.00	0.00	6.25	12.50	6.25	12.50
77	Blowdown from Evaporative Cooler B	0.00	0.00	6.25	12.50	6.25	12.50
78	Total Blowdown from Evap Coolers	0.00	0.00	12.50	25.00	12.50	25.00
79	Clean Drains, Evap Cooler Blowdown to SEWPCP	22.00	76.00	34.50	101.00	34.50	101.00
85	CT - A Pwr. Aug. or On Line Clean Stm. To Atms.	0.54	26.00	0.54	26.00	54.54	227.00
86	CT - B Pwr. Aug. or On Line Clean Stm. To Atms.	0.54	26.00	0.54	26.00	54.54	227.00
87	Condensate to Vac. Pumps and Closed Cooling	0.00	0.00	0.00	0.00	0.00	0.00
88	Condensate to Vacuum Pumps	0.00	0.00	0.00	0.00	0.00	0.00
89	Vacuum Pump to Drain	0.00	0.00	0.00	0.00	0.00	0.00
90	Condensate to Closed Loop Cooling System	0.00	0.00	0.00	0.00	0.00	0.00
91	Closed Loop Cooling System Drain	0.00	0.00	0.00	0.00	0.00	0.00
100	Gray Water Coming From SEWPCP	3264.00	3264.00	3264.00	3264.00	3264.00	3264.00
101	Gray Water After Chemical Treatment to Storage Tanks	3246.64	3246.64	3246.64	3246.64	3246.64	3246.64
102	Make-up Water to Cooling Tower	3239.00	3239.00	3239.00	3239.00	3239.00	3239.00
103	Cooling Water from Tower	139433.00	139433.00	139433.00	139433.00	139433.00	139433.00
104	Cooling Water to Closed Loop Cooling System	8000.00	8000.00	8000.00	8000.00	8000.00	8000.00
105	Cooling Water from Closed Loop Cooling System	8000.00	8000.00	8000.00	8000.00	8000.00	8000.00
106	Cooling Water from Condenser	131433.00	131433.00	131433.00	131433.00	131433.00	131433.00
107	Clean Drains, Blowdowns to SEWPCP	669.00	723.00	681.50	748.00	681.50	748.00
108	Sludge return to SEWPCP	17.36	17.36	17.36	17.36	17.36	17.36

Notes:
Case 1 - Full Load, Normal Operation with Evaporative Coolers - Off; Power Augmentation - Off
Case 2 - Full Load, Normal Operation with Evaporative Coolers - On; Power Augmentation - Off
Case 1 - Full Load, Normal Operation with Evaporative Coolers - On; Power Augmentation - On
a Numbers correspond to the process streams as shown on Figure 2-5
b See Table 2-9 in the AFC Doc, Wastewater Streams
c Offsite Disposal
d Included in line No. 54.
Evap. = Evaporative Coolers
PA = Power Augmentation
SF = Supplemental Firing
SEWPCP - Southeast Water Polution Control Plant

Table 2-4 Construction Techniques That Would Be Used For The New Pipeline			
Segment	Lines installed	Construction	Estimated length (feet)
Davidson Avenue from Quint Street to Rankin Street	18-in. effluent, fiber optic cable	Open cut trench	650
Rankin Street from Davidson Avenue to Evans Avenue	8-in. blowdown, 4-in. sludge	Open cut trench	250
SEWPCP property from Evans Avenue to thickeners	4-in. sludge	Install within existing pipe trenches and galleries	1,950
Davidson/Rankin intersection to Cesar Chavez Street/Indiana intersection	All	Install within existing overflow box culvert	2,500
Crossing Cesar Chavez Street	All	Jack & bore or microtunnel under street	100
Indiana Street, 26 th Street, Tennessee Street, and 23 rd Street to 3 rd Street	All	Open cut trench	2,400
Crossing 3 rd Street ⁽¹⁾	All	Jack & bore or microtunnel under street	100
23 rd Street from 3 rd Street to Potrero PP	All	Open cut trench	1,200
Total open cut trench or bore			4,700
Total installed in existing facilities			4,450
Total			9,150
Notes: (1). To avoid future construction disruption, an empty pipe conduit under 3 rd Street may be installed during the current light-rail construction for use later when installing the new pipeline.			



- 1 Wet/Dry Cooling Tower
- 2 Filtration Pumps
- 3 Backwash Tank
- 4 CIP Tank
- 5 UV Disinfection
- 6 Electrical Building
- 7 Membrane Aeration Blowers
- 8 Aeration Basin Blowers
- 9 Odor Control System
- 10 Membrane Bioreactor Basins
- 11 Aeration Basins
- 12 Membrane Recirculation Pumps
- 13 Alum Storage Tanks
- 14 Truck Unloading
- 15 Sodium Hydroxide Storage Tanks
- 16 Sodium Hypochlorite Storage Bins
- 17 Circulating Pump Water Basin
- 18 Electrical Building for Cooling Tower Combined with Station Control Building
- 19 Treated Water Pump Station



NOTES

- 1. All backgrounds are preliminary and approximate only.
- 2. All UTM global coordinates are from Zone 10, North American Datum of 1983.
- 3. Finished grade elevation at Unit 7 is EL.25' U.S. Tidal/Geodetic Datum referenced from MLLW = 0'-0".

Coordinates for New Stacks

UTM NAD 83 Zone 10 - State Plane NAD83 CA. 3
Southern Stack 1: UTM N4178950.5 - E554206.0
Southern Stack 1: State N2103339.8 - E6016883.9
Northern Stack 2: UTM N4178991.6 - E554204.0
Northern Stack 2: State N2103474.6 - E6016877.0

POTRERO UNIT 7 SITE PLAN

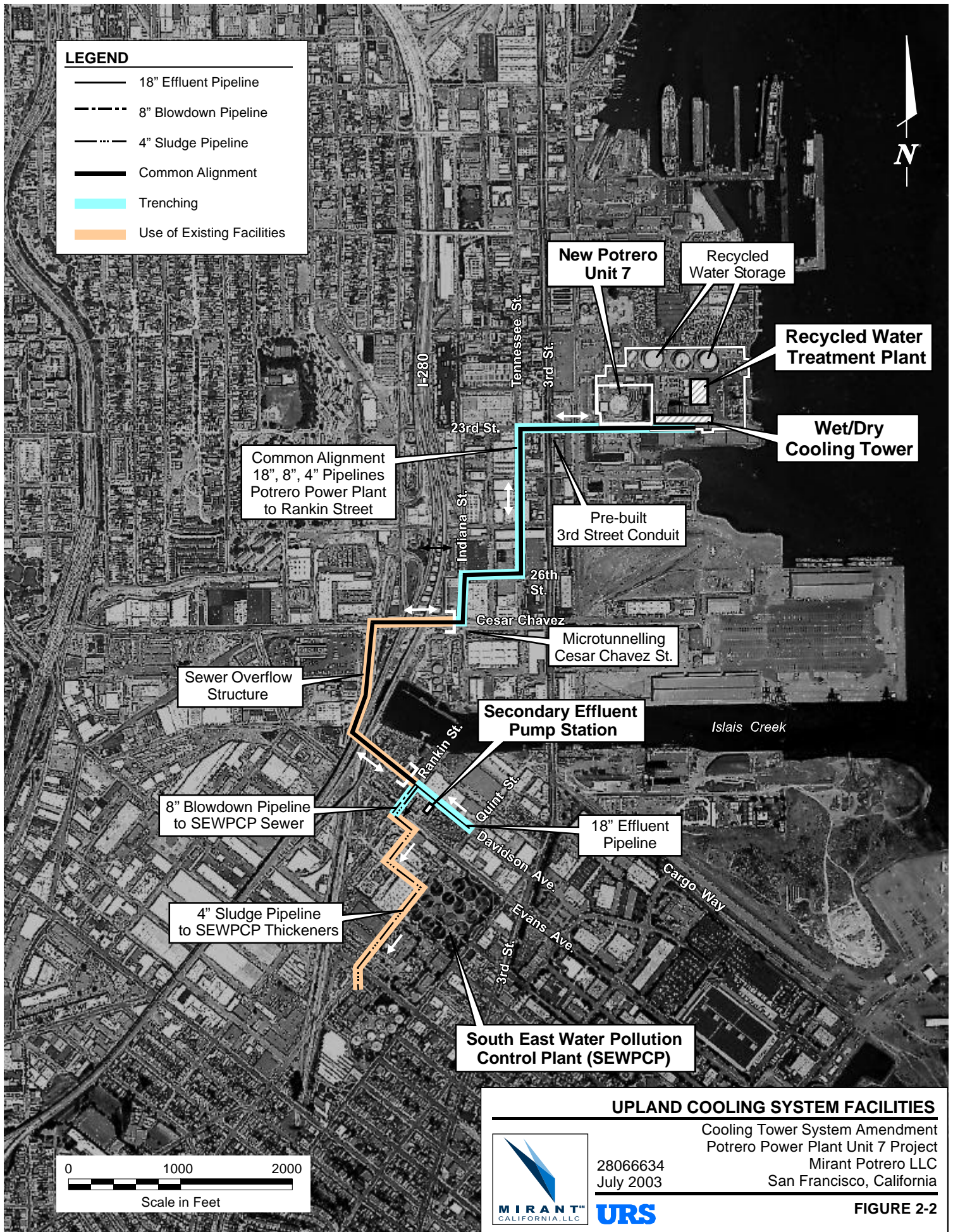
Cooling Tower System Amendment
Potrero Power Plant Unit 7 Project
Mirant Potrero LLC
San Francisco, California

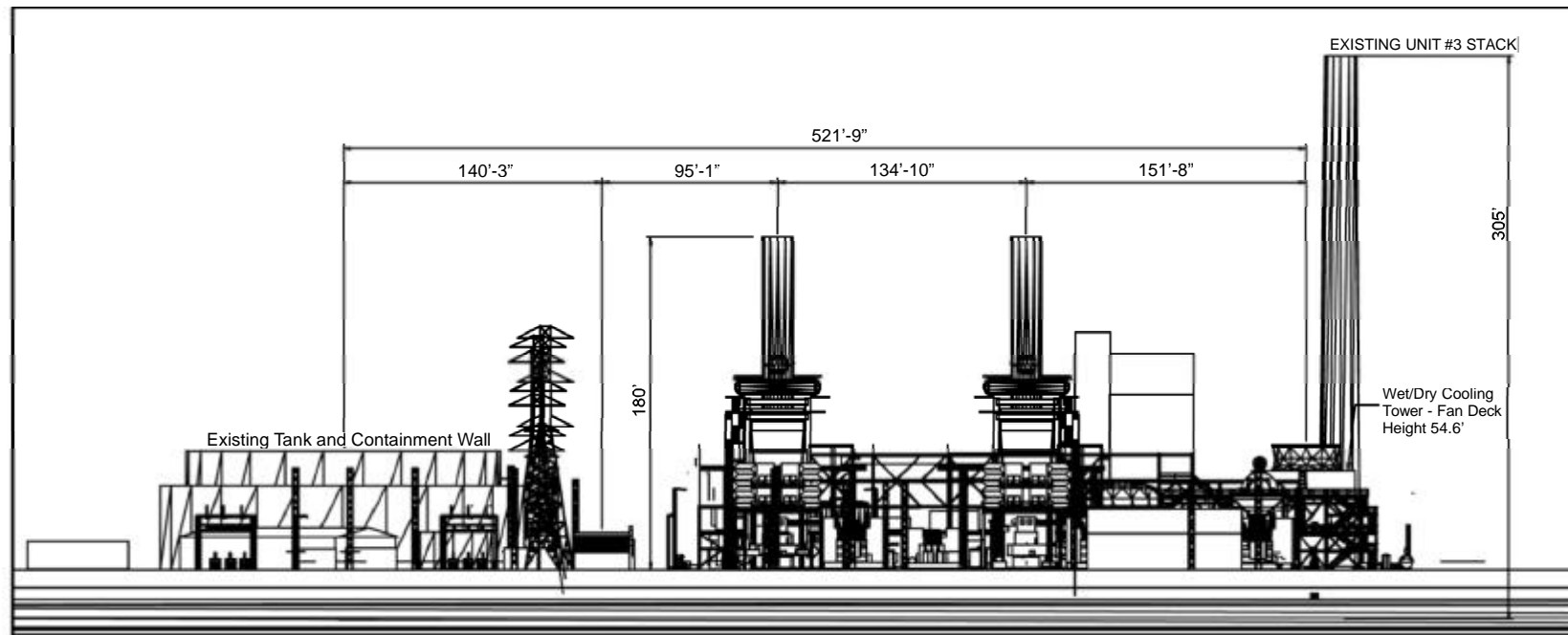


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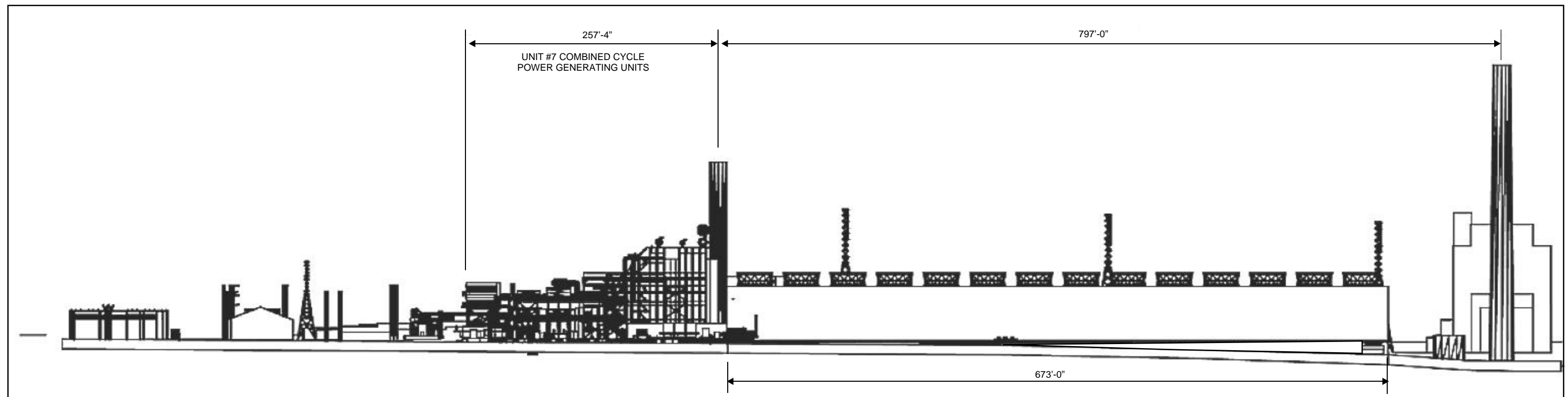


FIGURE 2-1

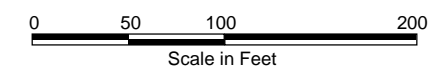




ELEVATION LOOKING EAST



ELEVATION LOOKING NORTH



POTRERO POWER PLANT ELEVATIONS

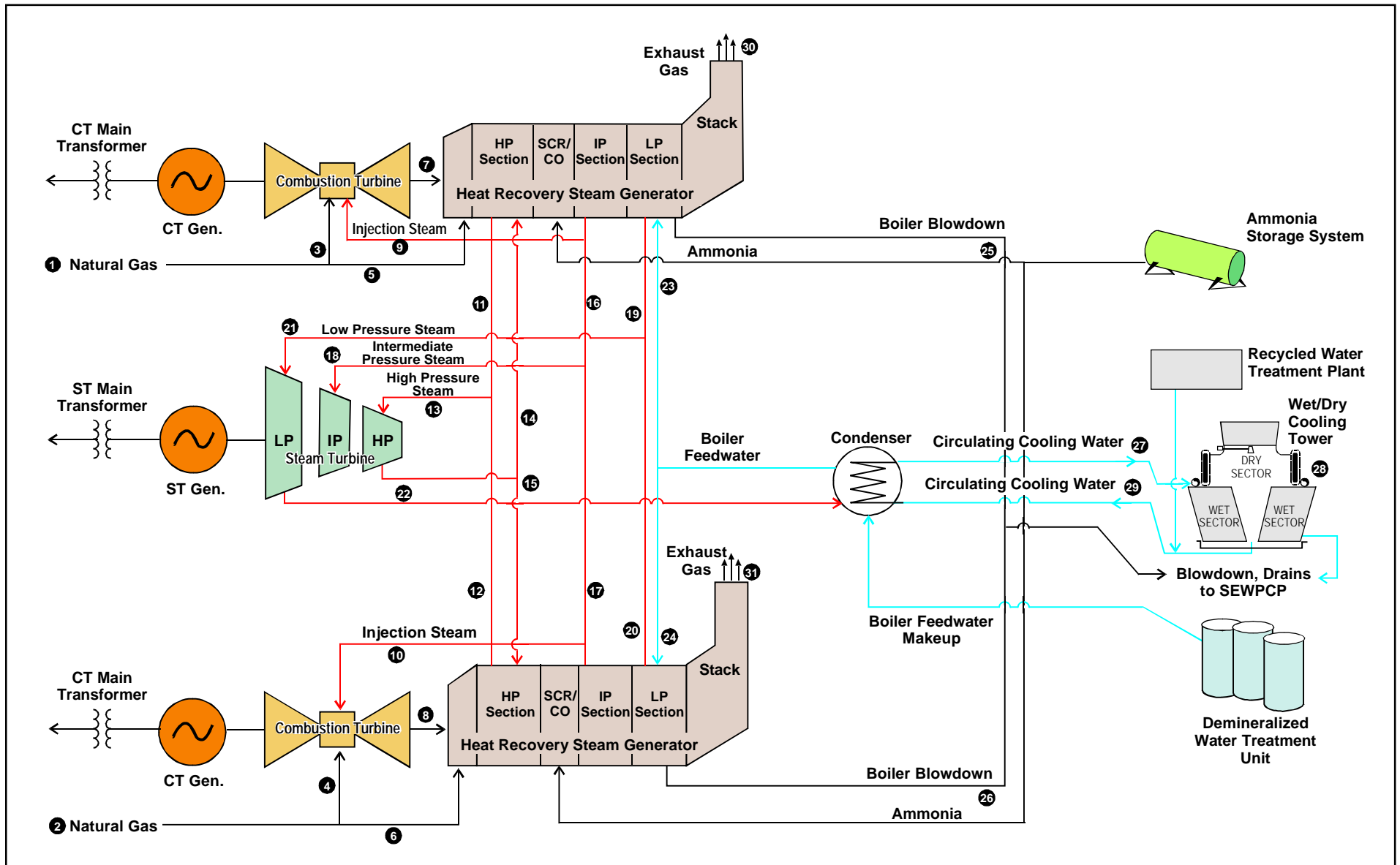
Cooling Tower System Amendment
Potrero Power Plant Unit 7 Project
Mirant Potrero LLC
San Francisco, California

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MIRANT
CALIFORNIA, LLC

URS

FIGURE 2-3



LEGEND

- ④ See Table 2-2 for explanation

UNIT 7 CONCEPTUAL PROCESS DIAGRAM/HEAT BALANCE

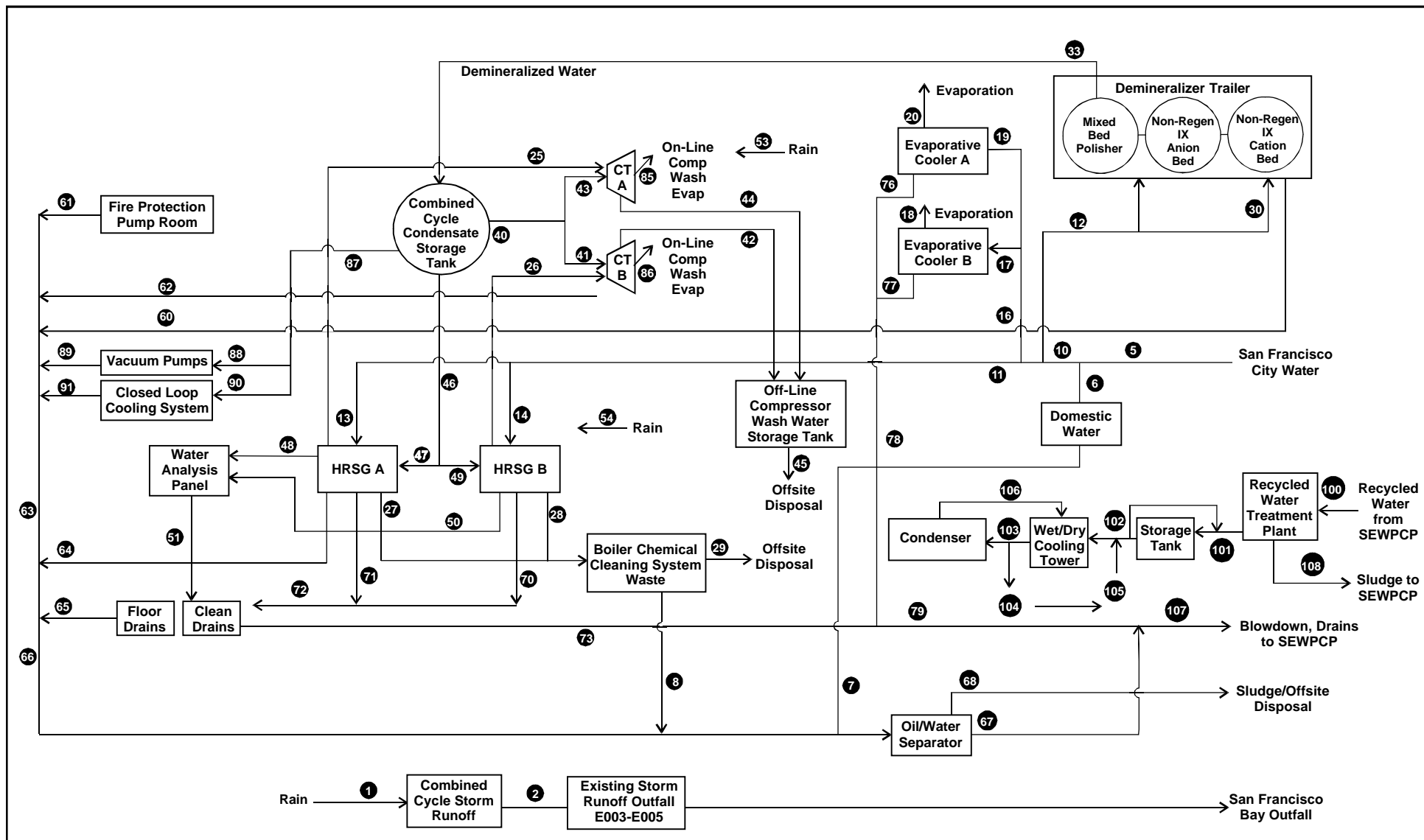


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San Francisco, California

FIGURE 2-4



LEGEND

- ④ See Table 2-3 for explanation

UNIT 7 WATER BALANCE DIAGRAM

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FIGURE 2-5

3.0 DEMAND CONFORMANCE AND PROJECT NEED

This section is not relevant to the cooling tower system and remains unchanged from the AFC.

4.0 FACILITY CLOSURE

The facility closure portion of the AFC remains unchanged and is applicable to the cooling tower system.

5.0 ELECTRICAL TRANSMISSION

Electrical transmission is not relevant to the cooling tower system. The AFC section remains unchanged.

6.0 NATURAL GAS SUPPLY

Natural gas supply does not apply to the cooling tower system. It will rely on electrical power for operating equipment.

7.0 WATER SUPPLY

If the cooling tower system is the adopted alternative, circulating cooling water from San Francisco Bay would not be used for cooling Unit 7. Unit 3 would continue to use Bay water. The water supply source for the cooling tower system would be secondary treated effluent from the Southeast Water Pollution Control Plant, treated on the Potrero PP site to tertiary recycled water standards. This water supply is described in Section 8.14, Water Resources.

All other aspects of water supply are unchanged from the AFC.

8.0 ENVIRONMENTAL INFORMATION

Changes to the Potrero PP Unit 7 project that would result from the use of the cooling tower system instead of the once-through cooling system described in the AFC are discussed in this chapter. The affected environment, environmental consequences, and mitigation measures that would not change with the cooling tower system are not discussed here. Laws, ordinances, regulations, and standards (LORS), involved agencies, permits, and references that are not discussed are unchanged from the information provided in the AFC.

The sections of this chapter are listed below.

- 8.1 AIR QUALITY
- 8.2 BIOLOGICAL RESOURCES
- 8.3 CULTURAL RESOURCES
- 8.4 LAND USE
- 8.5 NOISE
- 8.6 PUBLIC HEALTH
- 8.7 WORKER SAFETY AND HEALTH
- 8.8 SOCIOECONOMICS
- 8.9 AGRICULTURE AND SOILS
- 8.10 TRAFFIC AND TRANSPORTATION
- 8.11 VISUAL RESOURCES
- 8.12 HAZARDOUS MATERIALS HANDLING
- 8.13 WASTE MANAGEMENT
- 8.14 WATER RESOURCES
- 8.15 GEOLOGIC HAZARDS AND RESOURCES
- 8.16 PALEONTOLOGICAL RESOURCES

8.1 AIR QUALITY

This analysis of air quality impacts includes the following changes to the project, relative to what was analyzed in the AFC:

- The addition of the on-site recycled water treatment plant and the wet/dry cooling tower. This change introduces two new air pollution sources; the cooling tower itself and an odor control system vent. No air pollution sources were associated with the once-through cooling system. Therefore, no sources were dropped from the analysis.
- The reduction in emissions of all criteria air pollutants from the AFC. The applicant requested a reduction in emission limits previously¹. The majority of the emission reductions contained in that request are included herein. The requested reduction in the unit emissions rate of PM₁₀ from the gas turbines is deferred until after compliance source tests are performed.
- A minor relocation of some equipment from the locations that were analyzed in the AFC, including the two main stacks. The relocation of the equipment was announced by the applicant previously² and is only included herein for completeness.

This analysis of the project with the wet/dry cooling tower system was conducted according to California Energy Commission (CEC) power plant siting requirements. It also addressed U.S. Environmental Protection Agency (U.S. EPA) Prevention of Significant Deterioration (PSD) requirements and Bay Area Air Quality Management District (BAAQMD) permitting requirements for Determination of Compliance/Authority to Construct (DOC/ATC). The analysis is reported as follows:

- Section 8.1.1 describes updates to the local environment surrounding the Potrero PP. No changes from the AFC were made regarding meteorological data, including wind speed and direction (i.e., windroses), temperature, relative humidity, or precipitation. Ambient concentrations are included for particulate matter less than 10 micrometers in diameter (PM₁₀) and particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) through year 2002 (the most recent year for which data are available), because the cooling tower is a source of particulate matter.

¹ Letter to Marc Pryor, CEC from Mark Harrer, Mirant, dated July 11, 2002. Subject: Potrero Power Plant Unit 7 Project (00-AFC-4) – Submittal of Emission Reduction Request.

² Applicant's Revised Site Plan, CEC Docket No. 27438, 11/14/2002.

- Section 8.1.2 evaluates the changes to Unit 7 project's air quality impacts of PM₁₀ and PM_{2.5}. Impacts of nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), and precursor organic compounds (POC) would all decrease due to the emissions reduction request. Impacts for these air pollutants were shown to be less than significant in the AFC and therefore are not evaluated herein. The modeling analysis conducted for PM₁₀ and PM_{2.5} is presented; the results show no new exceedances of the California and federal Ambient Air Quality Standards (AAQS) or to the PSD increments from the proposed project. Also, air quality related values (AQRVs) are evaluated; no negative impact to visibility, terrestrial, or aquatic resources is predicted.
- Section 8.1.3 contains a discussion of why a cumulative impacts analysis (including off-project sources that have been permitted, or are in the process of being permitted, and are not yet operational) is not required to be conducted for this alternative.
- Section 8.1.4 describes the updated proposed project alternative emission offset strategy, including emission reduction credits (ERCs) and certificate numbers.
- Section 8.1.5 describes any newly applicable laws, ordinances, regulations, and standards that apply to the to the proposed project alternative.
- Section 8.1.6 updates the list of agency contacts used to conduct the air quality assessment.
- Section 8.1.7 lists the permits required and provides a permit schedule.
- Section 8.1.8 lists any new references used to conduct the air quality assessment.

Some air quality data are presented in other sections of this Application for Certification (AFC), including an evaluation of toxic air pollutants (see Section 8.6, Public Health).

8.1.1 AFFECTED ENVIRONMENT

The regional climate and meteorological conditions that influence transport and dispersion of air pollutants have not changed as a result of the inclusion of a cooling tower system. The existing air quality within the project region is presented in Table 8.1-1 and Table 8.1-2. The data presented in this section are representative of the Potrero PP site.

8.1.1.1 Climatology

The climatology of the Potrero Hill area was presented in the AFC. There would be no change to the climatology of the Potrero site as a result of the cooling tower system.

8.1.1.2 Existing Air Quality

This analysis as well as the air quality analysis in the AFC used the same hourly meteorological data collected from the project site from 1992 to assess pollutant transport and dispersion conditions.

Air quality measurements from the San Francisco, Arkansas Street station were provided in the AFC. The data presented were obtained from data collected at the BAAQMD-maintained Arkansas Street air monitoring station. This location was chosen as the primary monitoring site due its proximity to the project site. These data are considered representative of air quality at the Potrero PP site. The highest values from the three-year period 1996 through 1998 were used as the worst-case background concentration for the original analysis. The highest values from the three-year period 2000 through 2002 were used as the worst-case background concentration for the analysis of the project with the cooling tower system. Use of the three most recent years of data available was done at the direction of the BAAQMD and is consistent with the modeling protocol previously approved for the original air quality analysis. PM_{10} data are presented in Table 8.1-1.

Since the original analysis was preformed the state of California has promulgated its $PM_{2.5}$ ambient air quality standard. Air quality measurements from the San Francisco, Arkansas Street station are available for the period 1999 through 2002 and are presented in Table 8.1-2.

8.1.2 ENVIRONMENTAL CONSEQUENCES

This section describes the analyses conducted to assess the potential air quality impacts from the project with the cooling tower system. Impacts from the proposed project alternative are considered significant if, when combined with background ambient levels, they would exceed an ambient air quality standard, or if by themselves, they would exceed a PSD significant impact amount. These amounts are discussed in Section 8.1.5. Emissions estimates for both construction and operation of the proposed project are discussed. Dispersion model selection and setup are also described (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations) and analysis results are presented. In addition, visibility screening analyses are presented.

8.1.2.1 Project Site Construction Emissions

The primary emission sources during construction include heavy equipment emissions and fugitive dust from disturbed areas due to grading, excavating and construction at the site. Fugitive dust emissions were estimated in the AFC based on the amount of acreage to be disturbed during various construction stages. In that analysis all disturbed areas were treated identically regardless of the cause of their disturbance. Construction areas, equipment laydown areas, parking areas, etc. were totaled together. There will be no increase in the total on-site area to be disturbed relative to the area identified in the original analysis. For example, the cooling tower system will have more construction area but correspondingly less laydown area. Because there will be no net increase in the area of the site to be disturbed, the fugitive dust emissions estimated in the original analysis will be unchanged. The off-site laydown area, Pier 96, is paved and activity within the laydown area would not generate significant emissions.

A second source of emissions during construction is equipment exhaust. Additional construction equipment is required for the cooling tower and make-up water treatment system, but the construction equipment requirements for the once-through cooling system is eliminated. Mirant has estimated that the total equipment usage to construct the cooling tower and make-up water treatment system will be less than the total equipment usage to construct the once-through-cooling system, based on total months of equipment usage. Because there will be no net increase in the construction equipment, the construction equipment emissions estimated in the original analysis will be the worst case.

Emissions from off-site traffic including construction worker vehicles, deliveries of materials and supplies to the site and to the laydown area, and the shuttles going between the site and Pier 96 were estimated for an area within a three mile radius of the site and are much less than the on-site emissions. The much higher, and much more concentrated nature of the emissions from the site are, therefore, the worst case with respect to the subsequent modeling analysis.

No new construction emissions inventory is presented for the proposed project alternative because the emissions inventory for the AFC is the worst case.

8.1.2.2 Pipeline Construction Emissions

As described in Section 2.0, Project Description, the proposed project alternative will require the construction of a buried water line from the SEWPCP to the site and return lines back to the SEWPCP. All pipelines will be in a common trench for much of the alignment. The AFC included an analysis of the air quality impacts from the construction of a buried transmission line from Potrero site to the switchyard at Hunters Point Power Plant. These two

construction activities are very similar with respect to air quality impacts. Therefore, the analysis of the air quality impacts from the construction of the cable line in the AFC may be used as the analysis of the impacts from the pipeline construction for the cooling tower system. Both the construction of the pipeline and the construction of the transmission line will have similar impacts: very localized to their respective, but different, paths; occurring only during the period of actual construction and are less than significant.

8.1.2.3 Operational Emissions

8.1.2.3.1 Cooling Tower

The cooling tower will be a source of PM_{10} (and $PM_{2.5}$). Water circulating within the tower will be captured by a mist eliminator system and returned to the tower. The mist eliminators will allow some water droplets (only 0.0005% or less of the circulating water) to escape the tower as "drift." After leaving the cooling tower the water droplets will evaporate completely, leaving any solid materials as particulate matter. In this analysis, it was assumed that as a worst-case, all of the suspended and dissolved solids in the drift would form PM_{10} . The estimated maximum hourly and annual cooling tower PM_{10} emissions are summarized in Table 8.1-3. These emissions were based on the on-site recycled water treatment plant effluent analysis, assuming a five-fold concentration cycle, and the proposed drift rate of the cooling tower. Additional details on the cooling tower PM_{10} emissions calculations are contained in Appendix A.

8.1.2.3.2 Odor Control System

The on-site recycled water treatment plant will be equipped with an odor control system. Air from the enclosed aeration basins and membrane basins will be withdrawn through ducts and a fan and passed through a granular activated carbon bed to control odors (POC emissions). Total POC emissions from the odor control system will be less than 10 pounds per day. The total POC emissions from the odor control system is presented in Table 8.1-4. A list of the POC species is presented in Table 8.6-2 in the Public Health section of this document. Additional details on the odor control system POC emissions calculations are contained in Appendix A.

8.1.2.3.3 Emissions Reduction Request

The following section contains a summary of a request made previously by the applicant to reduce the allowable emissions from the gas turbines. The reduced emissions requested are applicable to both the AFC and the project with a cooling tower system because the operations of, and emissions from, the gas turbines will be identical under each project alternative.

On December 4, 2001, the Bay Area Air Quality Management District (BAAQMD) issued a Final Determination of Compliance (FDOC) for the Potrero Unit 7 Project (Potrero Unit 7). The FDOC concluded that Potrero Unit 7 would comply with all applicable federal, state and BAAQMD regulations; including best available control technology and emission offset requirements. Notwithstanding this determination by the BAAQMD, the local community, and other interested parties, have continued to express concerns related to emissions from Potrero Unit 7. In response to these concerns, Mirant has evaluated means by which project emissions could be reduced. The proposal set forth below will reduce emissions of all pollutants by up to 23% from previously projected levels.

In addition to modifications required in connection with the alternative cooling system, Mirant proposes a reduction in the allowable emission rates of all criteria pollutants. This reduction results from modifications to the original Potrero Unit 7 operating scenario. The annual hours of operation of each of the gas turbines, and of each of the duct burners, will be reduced. This modification results in lower emissions of all pollutants. Table 8.1-5 presents the criteria pollutant emission rates that appeared in the original applications and the revised amounts that result from the proposed changes.

The revised Potrero Unit 7 operational emissions spreadsheet incorporating the operating hour's modification is provided in Appendix A.

8.1.3 OPERATIONS

The annual hours of operation of each of the gas turbines of Potrero Unit 7 will be reduced from a maximum of 8,760 hours (100 percent of the year) to a maximum of 7,446 hours (85 percent of the year). The annual hours of operation of each of the duct burners of Potrero Unit 7 will be reduced from a maximum of 7,090 hours to a maximum of 2,200 hours. The reduced hours of operation will result in lower emissions, and still allow Potrero Unit 7 to supply the power needed for the City of San Francisco.

Mirant will accept conditions of certification specifying these reduced hourly limits. The modification of the operating scenario will result in the reduction of each criteria pollutant by about 23 percent on an annual basis.

8.1.3.1 PM₁₀ Emission Rate

The PM₁₀ unit emission rates in terms of pounds of PM₁₀ emitted per hour for each turbine were also discussed in the emission reduction request previously submitted³ to the BAAQMD and subsequently withdrawn. At this time the applicant is not proposing a

³ *ibid* footnote 1.

reduction in the allowable PM₁₀ unit emission rates. Actual source test data from other similar power plants are becoming increasingly available. While that data show, on average, that the expected PM₁₀ emissions will be over 40 percent lower than what is allowed under the current FDOC, the data also show some unit to unit variability. This variation can only be settled after the Unit 7 turbines are operational and undergo compliance testing. Therefore, Mirant is withholding its request for a reduction in unit emission rates until that time. Mirant is requesting a condition of certification be included to allow the PM₁₀ emission limits to be re-evaluated and potentially lowered based on the results of the compliance tests.

Table 8.1-6 shows the criteria pollutant annual emissions for the proposed project with a wet/dry cooling tower system.

Emissions and calculations for all scenarios are contained in Appendix A.

8.1.3.2 Revised Site Plan

Mirant has made some changes to the locations of some of the equipment of Unit 7. These changes were made to improve the accessibility of Unit 7 equipment for maintenance but did not change the footprint of the major excavation. The northern train (including the HRSG exhaust stack) has been moved approximately 10.46 meters (34.32 feet) and the southern train (including the HRSG exhaust stack) has been moved approximately 12.78 meters (41.93 feet), both to the southwest of the locations in the AFC. This move increases the separation between the centerlines of the two exhaust stacks from 120 feet to 135 feet.

The entire steam turbine generator structure has been rotated 90 degrees from the former north-south to an east-west orientation. The control room has been relocated adjacent to the east end of the perimeter of the steam turbine generator structure.

The above changes in the physical layout have been input into the air dispersion models.

8.1.3.3 Air Dispersion Modeling

Air dispersion modeling was performed for PM₁₀ to quantify the impacts of the cooling tower in combination with the two HRSG exhaust stacks. The odor control system will emit only POC. However, POC emissions are not modeled for impacts to air quality. The air dispersion models used and the protocol for their use were not changed from the AFC.

No additional air quality dispersion modeling is required for CO, NO_x, and SO₂ because none of the air quality impacts will be higher for the project with the cooling tower system,

and all impacts determined in the original air quality impact analysis were in compliance with all applicable rules, regulations and air quality standards.

Modeling showed that the increased separation between the two HRSG exhaust stacks resulted in smaller impacts on a unit basis than the impacts in the original analysis. The impacts of increasing the separation between the two turbine stacks was assessed by comparing the normalized impacts (in micrograms per cubic meter per gram per second of emissions) from the original analysis to the normalized impacts from the project with cooling tower system analysis. Both the 24-hour and the annual normalized impacts were reduced, each by less than one percent, due to the increased distance between the stacks. The normalized basis analysis was made necessary due to the emission reduction.

The analysis discussed above also confirmed that the addition of the cooling tower structure to the site plan did not introduce any new building wake effects on the HRSG exhaust stack plumes.

The modeling protocol specified placing receptors for the SHORTZ analysis at all elevations greater than stack height. Because the cooling tower height is lower than the HRSG stack height, additional receptors needed to be added for the SHORTZ runs. This did not change the conclusion determined in the AFC that the maximum ISC results were greater than the SHORTZ maximum results. Therefore, only ISC results are presented herein.

Input and output files for the modeling analysis and intermediate calculations are included in Appendix A.

8.1.3.4 Compliance with Ambient Air Quality Standards

Air dispersion modeling was performed as described in Section 8.1.2.3 to evaluate the potential change in PM₁₀ ground level concentrations from the turbine and cooling tower operational emissions relative to the applicable 24-hour and annual AAQS. The maximum increases were added to the maximum background concentrations based on air quality data collected for the most recent three years (i.e., 2000 to 2002). The impact was then compared with the most stringent state or federal AAQS.

Construction Activities. Air dispersion modeling of construction emissions was performed in the AFC to satisfy CEC requirements. All maximum criteria pollutant concentrations for construction at the project site were predicted to occur at receptors along the northern boundary of the facility. No new modeling of the construction emissions is necessary for the project with the cooling tower system because the emissions rates did not increase. Construction impacts on AAQS are not the primary focus of the air regulatory agencies because construction emissions would be temporary in nature and would not coincide with

emissions from plant operations. Construction mitigation measures identified in the AFC will be used to minimize impacts from temporary construction emissions.

Air dispersion modeling of emissions from the underground transmission cable was performed in the AFC and those impacts are applicable to the buried pipeline due to the similar nature of the two activities.

Normal Plant Operations. Maximum modeled impacts for PM₁₀ emissions from the turbines and the cooling tower are below federal PSD significant impact levels. Modeled impacts are shown in Table 8.1-7. Modeled impacts due to plant operation emissions from the project with the cooling tower system would not cause a violation of any federal or state AAQS and would not significantly contribute to the existing PM₁₀ background. However, the existing PM₁₀ background does exceed state PM₁₀ standards. Annual and 24-hour PM₁₀ impacts were generally predicted to occur on or near the facility's eastern fenceline.

Fumigation impacts for PM₁₀ emissions from the turbines and the cooling tower were estimated as described in Section 8.1.2.3 and are summarized in Table 8.1-8. Inversion and shoreline fumigation impacts are all below PSD significance thresholds.

Impacts for Nonattainment Pollutants and their Precursors. The emission offset program in the BAAQMD was developed to facilitate net air quality improvement. The proposed project impacts for PM₁₀ will be mitigated by emission offsets. These offsets have not been accounted for in the modeled impacts noted above. Thus, the proposed project's modeled impacts may significantly overestimate actual project impacts because they do not account for the effect of removing future PM₁₀ from areas surrounding the project site.

8.1.3.5 Impacts on Air Quality–Related Values in Class I Areas

The AFC contained analyses of the criteria air pollutant emissions with regard to their potential to affect visibility, terrestrial resources and aquatic resources. The original analysis concluded that there would be no significant impacts to any of these air quality-related values. No additional air quality dispersion modeling is required for any of these air quality-related values because none of the air quality impacts will be higher for the proposed project alternative.

8.1.3.6 Soils and Vegetation Analysis

The AFC showed that all impacts to soil and vegetation would be below U.S. Forest Service (USFS) significance criteria. The reduction in annual emissions of NO₂ and SO₂ will make these less than significant impacts even lower.

8.1.4 CUMULATIVE IMPACTS ANALYSIS

A cumulative air quality impact analysis was conducted in response to California Energy Commission Data Request No. 150 on the AFC. There will be no quantifiable increase on the impacts determined by the cumulative analysis as a result of this amendment.

8.1.5 MITIGATION

As a result of the reduction in emissions of NO_x, volatile organic compounds (VOC), and PM₁₀, reduced amounts of emission offsets will be provided for these three pollutants. In addition, PM₁₀ emissions will be offset through the surrender of PM₁₀ emission reduction credits (ERCs). The original proposal to use SO₂ credits to offset PM₁₀ at an interpollutant ratio of 3 to 1 is withdrawn. In addition, 100 percent of the SO₂ emissions will be voluntarily offset through the surrender of SO₂ ERCs. Table 8.1-9 presents the revised offset package and sources of the ERCs.

8.1.6 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable LORS related to the potential air quality impacts from the proposed project are discussed in the AFC. Several new LORS have been identified due to this amendment.

The State has promulgated changes in the applicable air quality standards for particulate matter effective July 5, 2003. The annual standard for PM₁₀ has been changed from an annual geometric mean of 30 µg/m³ to an annual arithmetic mean of 20 µg/m³. A new annual standard of 12 µg/m³ (arithmetic mean) for PM_{2.5} has been added. The area around the Potrero Power Plant has recorded particulate matter concentrations above these amounts. The impacts of the particulate matter emissions from this project will be mitigated by offsets as discussed in Section 8.1.4.

8.1.7 INVOLVED AGENCIES AND AGENCY CONTACTS

Agency contacts regarding the air quality impact assessment of the amended project are updated as follows:

Agency	Contact/Title	Telephone
California Energy Commission	Roger Johnson/Siting Program Manager Tuan Ngo/Associate Mechanical Engineer 1519 Ninth Street Sacramento, CA 95814	(916) 654 3852

Agency	Contact/Title	Telephone
Bay Area Air Quality Management District	Steve Hill/Manager Permit Evaluation Bob Nishimura/Air Quality Engineer Glen Long/Senior Air Quality Engineer 939 Ellis Street San Francisco, CA 94109	(415) 771-6000

8.1.8 PERMITS REQUIRED AND PERMITTING SCHEDULE

This section lists the required permit related to Air Quality for the proposed project. The permit is summarized in the following table.

Responsible Agency	Permit/Approval	Schedule
Bay Area Air Quality Management District (BAAQMD)	Authority to Construct/ Permit to Operate	Application to be filed concurrent with AFC filing. 45-day application review period.

Under Regulation 2, Rule 1, BAAQMD regulates the construction, alteration, replacement, and operation of new sources of air pollution. This permitting process allows the BAAQMD to adequately review new and modified air pollution sources to ensure compliance with all applicable prohibitory rules and to ensure that appropriate emission controls are used. The proposed amendment to the project is required to obtain a modification to the Determination of Compliance already obtained from the BAAQMD for the original project. This modification will address the two new air pollution sources. The cooling tower is a relatively common source and the odor control system will likely be an exempt source. Therefore, it is not anticipated that the application will require a lengthy review. The modification of the Final DOC should be issued within 30 to 60 days after receipt of complete applications.

8.1.9 NEW REFERENCES

CARB (California Air Resources Board), 2002, Aerometric Data Analysis and Management System web site, (<http://www.arb.ca.gov/adam/welcome.html>)

Table 8.1-1
Ambient Particulate Levels (<10 μm) at Arkansas Street Station,
San Francisco, California
(1993–2002 ($\mu\text{g}/\text{m}^3$))

Measurement	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Maximum 24-Hour Average	69.0	93.0	49.9	70.9	81.0	52.4	77.9	63.2	67.4	49.7
Estimated Number of Days Exceeding California Standard ^a (50 $\mu\text{g}/\text{m}^3$; 24-hour avg.)	30	36	0	12	18	6	36	12	42	0
Estimated Number of Days Exceeding Federal Standard ^a (150 $\mu\text{g}/\text{m}^3$; 24-hour avg.)	0	0	0	0	0	0	0	0	0	0
Annual Geometric Mean ^b	25	25	22	21	22	20	22	21	22	20
Annual Arithmetic Mean ^c	29	28	25	24	25	22	26	24	26	21

Source: CARB, 2002.

Notes:

Maximum average values occurring during the most recent three years are indicated in bold.

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

^a Measurements are typically collected every six days. Values reported are estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

^b The annual geometric mean concentration California PM_{10} ambient air quality standard was lowered from 30 $\mu\text{g}/\text{m}^3$ to 20 $\mu\text{g}/\text{m}^3$ arithmetic mean effective July 5, 2003.

^c All annual arithmetic mean concentrations are below the federal PM_{10} ambient air quality standard of 50 $\mu\text{g}/\text{m}^3$.

Table 8.1-2
Ambient Particulate Levels (<2.5µm) at Arkansas Street Station,
San Francisco, California
(1999–2002 (µg/m³))

Measurement	1999	2000	2001	2002
Maximum 24-Hour Average	71.2	47.9	76.6	70.2
98 th Percentile 24-Hour Average	47.4	35.3	51.3	57.5
Estimated Number of Days Exceeding 98 th Percentile Federal Standard ^a (65 µg/m ³ ; 24-Hour Average)	0	0	0	0
Annual Arithmetic Mean ^b	12.6	11.4	11.5	13.1
3-year average of Arithmetic Mean ^c			11.8	12.0

Source: CARB, 2002.

Notes:

Maximum average values occurring during the most recent four years are indicated in bold. Measurements commenced in 1999.

µg/m³ = micrograms per cubic meter

^a The Federal Standard evaluates the 98th percentile sample for the year. Values reported are number of days that a measurement would have been greater than the level of the standard. California has no separate 24-hour state standard.

^b The state standard is an annual arithmetic mean concentration of 12 µg/m³ effective July 5, 2003.

^c The 3-year statistics include data from the listed year and the two years before the listed year. The Federal standard is 15 µg/m³ as a 3-year average of the annual arithmetic mean concentration.

Table 8.1-3
PM₁₀ Emissions from Cooling Tower

Water Rate	140000	gpm	
Drift Rate	0.0005	%	
Number of Cells	14		
Maximum TDS+TSS	7015	ppmw	
	Emission Rate		
	lb/hr/cell	g/s/cell	tons/yr/tower
PM ₁₀	0.176 ^a	2.2E-02 ^a	9.2 ^b

Notes:

PM₁₀ = particulate matter less than 10 microns in diameter

gpm = gallons per minute

ppmw = parts per million by weight

TDS = total dissolved solids

TSS = total suspended solids

a: Maximum Emission Rate.

b: Assumes annualized usage of 7,446 hrs/year.

Table 8.1-4 POC Emissions from Odor Control System				
Water Treated	4.7	millions of gallons per day (mgd)		
	Uncontrolled Emission Factor ¹	Controlled Emissions ²		
	lb/yr/mgd	lb/day	lb/year	ton/yr
Total POC	190	1.22	446.5	0.223
Notes 1. Uncontrolled emission factor obtained from water treatment system designers. 2. Assumes usage of 8760 hours per year and 50% control efficiency as conservative worst case.				

Table 8.1-5 Comparison of Criteria Pollutant Annual Emission Rate From the Combustion Turbines (tons per year)		
Pollutant	Original Application	Revised Amount ¹
NO _x	178.4	137.9
CO	265.1	205.9
POC	49.1	37.8
SO ₂	26.0	19.8
PM ₁₀	110.5	86.3
1: Based on 7,446 hours of total operation per year and 2,200 hours of duct burner operation per year for each turbine.		

Table 8.1-6 Criteria Pollutant Annual Emissions for the Proposed Project Alternative		
Pollutant	Emissions (tons/year) ^{a,b}	
POC	Turbines	37.8
	Odor Control System	<u>0.2</u>
	Total	38.0
CO	Turbines	205.9
NO _x	Turbines	137.9
SO ₂	Turbines	19.8
PM ₁₀	Turbines	86.3
	Cooling Tower	<u>9.2</u>
	Total	95.5
Notes: CO = carbon monoxide NO _x = nitrogen oxides PM ₁₀ = particulate matter less than 10 microns in diameter POC = precursor organic compound SO ₂ = sulfur dioxide ^a Includes emissions from two turbines, except PM ₁₀ includes turbines and cooling tower combined. ^b Turbine emissions include 28 cold startups, 11 hot startups, and 39 shutdowns, and 4,400 hours at 100% duct burner capacity with the balance of 85% of the year operating at 100% load at 55°F. Odor control system emissions based on 8,760 hours per year of operation. Cooling tower emissions based on 7,446 hours per year of operation.		

Table 8.1-7
Unit 7 Project ISCST3 Modeling Results for the Proposed Project Alternative

Pollutant	Averaging Period	Maximum Modeled Impact (µg/m³)	PSD Significant Impact Level ^a (µg/m³)	Background ^b (µg/m³)	Total Predicted Concentration (µg/m³)	AAQS (µg/m³)	UTM Coordinates	
							East (m)	North (m)
ISCST3 Routine Plant Operation Impacts								
PM ₁₀	24-hour ^c	4.96	5	67.4	72.36	50	554,658	4,178,742
	Annual ^d	0.84	1	26	26.84	20	554,633	4,178,792
PM _{2.5} ^e	24-hour ^c	4.96	NA	57.5	62.46	65	553,658	4,178,742
	Annual ^d	0.84	NA	13.1	13.94	12	554,633	4,178,792

Notes:

AAQS = Most stringent ambient air quality standard for the averaging period.

NA = Not applicable

m = meters

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

PM₁₀ = particulate matter less than or equal to 10 microns in diameter

PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter

^a Source: 40 CFR 52.21

^b Background represents the maximum value measured at San Francisco, Arkansas Street monitoring station, 2000–2002.

^c Based on two turbines at 50% load, 80°F emissions and stack parameters, and cooling tower at full operation

^d Based on maximum annual gas turbine emissions and 50% load, 80°F stack parameters, and cooling tower operating 7446 hours/yr

^e Based on the assumption that all PM₁₀ is PM_{2.5} (worst case)

Table 8.1-8 Proposed Project Operations Fumigation Impact Summary			
Source	Impact ($\mu\text{g}/\text{m}^3$)	Distance (m)	Description
Turbine Fumigation Scenario			
Turbines	3.5	2,268	Shoreline fumigation, TIBL = 5
Cooling Towers	0.8	2,268	Normal dispersion
TOTAL	4.3	2,268	
Cooling Tower Fumigation Scenario			
Turbines	1.5	4,612	Normal dispersion
Cooling Towers	1.2	4,612	Inversion fumigation
TOTAL	2.7	4,612	
Shoreline Fumigation impacts converted from 1-hr SCREEN3 results to 24-hour results by applying a persistence factor of 0.083. Other 1-hr SCREEN3 results multiplied by 0.4 to convert to 24-hr concentrations.			

Table 8.1-9 Revised Offset Package			
(tons per year)			
Pollutant	Mitigation Amount Required	ERC Certificates	
		Certificate Number	Amount
NO _x	158.591	809	158.591
POC	43.739	756	0.390
		808	38.049
		<u>809</u>	<u>5.300</u>
		Total	43.738
PM ₁₀	95.465	756	6.443
		808	63.752
		<u>809</u>	<u>25.270</u>
		Total	95.465
SO ₂	19.771	809	19.771

8.2 BIOLOGICAL RESOURCES

8.2 BIOLOGICAL RESOURCES

This section describes biological resources in the areas where components of the wet/dry cooling system would be developed, and the effects of construction and operation of the upland cooling system on those resources. The biological resources of the Potrero PP site, including a regional overview, were described in the AFC and are not repeated here. The on-and off-site components of the upland cooling system are within the biological resources study area boundary of the AFC; therefore no additional data collection was required.

8.2.1 AFFECTED ENVIRONMENT

The project is in an urbanized area of the San Francisco peninsula, near the western shore of San Francisco Bay. The former shore and Bay shallows in this area have been filled and are now occupied by industrial and commercial structures, piers, streets, and paved surfaces. The areas affected by the upland cooling system include portions of the Potrero PP site and public streets used for the pipeline alignment between the Potrero PP site and the SEWPCP. The land surface at all locations designated for construction of upland cooling system components currently is either paved or occupied by structures. The nearest habitat to any part of the cooling system is the Bay, located about 350 feet east of the east end of the proposed cooling tower.

The potential laydown area at Pier 96 is also paved. The pier's shoreline is protected by riprap and is sufficiently deep to allow vessel mooring. Heron's Head Park, a 25-acre man-made peninsula, is located south of Pier 96. This park may provide foraging and some nesting habitat for sensitive avian species. However, the park is separated from Pier 96 by approximately 600 feet of water at its nearest point. The park shoreline facing Pier 96 is riprap.

8.2.2 ENVIRONMENTAL CONSEQUENCES

The upland cooling system would replace the proposed once-through cooling system described in the AFC. If the once-through cooling system is not constructed, the biological impacts and benefits of that system would not occur. With the development of an upland cooling system alternative, the current environmental relationship between the Potrero PP and the Bay would remain. Existing Unit 3 would continue to be cooled by the existing once-through cooling system using Bay water, and the proposed Unit 7 would use the new upland cooling system based on a wet/dry cooling tower and recycled wastewater.

At the Potrero PP site, construction of the wet/dry cooling tower, the recycled water treatment plant, and associated pumps and piping would occur in areas that are paved or covered by structures. Therefore, no impacts to biological resources would occur from

construction. Operation of the cooling tower forces air up through the tower. However, the air intake is at a low velocity such that people can work safely below the intake. At the proposed recycled water treatment plant, water surfaces in tanks and basins would be covered. This would make them inaccessible to birds that could be attracted to water surfaces. Therefore, the potential for impacts to occur to birds from cooling tower or the water treatment facility is considered unlikely.

The off-site pipeline alignment would be installed in public streets and rights-of-way. Given the lack of biological resources in this urban setting, there would be no impacts to biological resources from pipeline construction. The pipeline is underground, therefore operations would have no impact on biological resources.

At the Pier 96 laydown area, existing paved surfaces and warehouses would be used for storing and handling construction materials. The use of this port facility for laydown is expected to have no impact on biological resources. Given the distance between Pier 96 and Heron's Head Park and the intermittent nature of noise-generating activity in a laydown area, impacts are not expected to occur to the park or any biological resources found there.

8.2.3 MITIGATION MEASURES

No significant biological impacts were identified in the AFC as a result of the construction and operation of the Unit 7 project. This remains the case with the use of an upland cooling system in place of a once-through cooling system. Therefore, no mitigation measures are proposed.

8.2.4 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No additional LORS related to biological resources would apply to the proposed wet/dry cooling system beyond those described in the Potrero PP Unit 7 Project AFC.

8.3 CULTURAL RESOURCES

The archaeological investigation for the upland cooling tower system complements the work completed for the AFC. A record search and archaeological resources survey of the underground pipeline route for the cooling tower system were completed for this portion of the project. In addition, the results of the previous investigation performed for the AFC were consulted to assess potential impacts to archaeological resources within the confines of the Potrero PP site. A potentially significant archaeological resource, the Gibbon's Powder Magazine, avoided by the design presented in the AFC, may be affected by the construction of the cooling tower system.

8.3.1 AFFECTED ENVIRONMENT

No additional archival or field investigations were required for historic architectural resources. The pipeline would be buried within existing roads, and therefore would not affect any historic properties along the alignment. The AFC was consulted to address impacts to historic structures within and adjacent to the Potrero PP. No additional impacts to historic architectural resources would occur with the adoption of the upland cooling tower system.

The methods used to inventory the route of the upland cooling system pipeline for archaeological resources consisted of archival research and a pedestrian reconnaissance of the project corridor. As the proposed pipeline corridor is confined to existing roads, the archaeological survey was likewise confined to the existing roadways. The ground surface of the proposed pipeline corridor was obscured by pavement for its entire length.

Archaeological Resources – Archival Research

Additional archival research was completed only for the proposed pipeline. This research included a literature review and record search of ethnographic and historic literature and maps, federal, state, and local inventories of historic properties, archaeological base maps and site records, and survey reports on file at the Northwest Information Center at Sonoma State University. The Information Center serves as a regional office of the State Historic Preservation Office (SHPO). The purpose of the record search was to ascertain whether any cultural resources had been previously identified within or adjacent to the pipeline. All available relevant data for locations occurring within one-quarter mile of the proposed project were reviewed.

The record search revealed that no archaeological resources have been previously recorded within the proposed pipeline corridor. The record search did reveal that two archaeological pedestrian reconnaissance-level investigations have been conducted within

or immediately adjacent to small portions of the pipeline route. Caltrans archaeologists Hayes and Hylkema (1989) conducted a survey for a proposed on-ramp to I-280 (at the head of Islais Creek Channel) and SAIC (2000) completed a survey of a proposed fiber optic cable along the I-280 corridor. No archaeological resources were identified in the pipeline project areas a result of these efforts.

Although additional archival research was completed for the pipeline corridor, the record search for the AFC was also consulted, given the reconfiguration of the cooling system within the plant site. This review revealed that the Gibbon's Powder Magazine identified in trenching by Wirth Associates (1979a, 1979b) is within or immediately adjacent to the footprint of portions of the recycled water treatment plant, a component of the upland cooling tower system.

Archaeological Resources – Field Reconnaissance

URS Archaeologist Mark R. Hale conducted the pedestrian reconnaissance of the route of the cooling system pipeline on July 7, 2003. The reconnaissance involved walking one side of the public thoroughfares from the power plant southward towards the water pollution control plant and walking the opposite side on the return trip while visually inspecting areas of exposed soil, including planter strips, medians, and curb-cuts.

8.3.2 ENVIRONMENTAL CONSEQUENCES

8.3.2.1 Archaeological Resources

Additional archival research, a field reconnaissance, and review of the AFC were completed to determine the potential effects to archaeological resources that would result from construction of the cooling tower system. These efforts revealed that the Gibbon's Powder Magazine, a historic period archaeological resource identified by Wirth Associates (1979a, 1979b) is within or immediately adjacent to the footprint of the recycled water treatment plant component of the cooling tower system. Thus, it is possible that with implementation of the upland cooling system this previously identified archaeological resources may be affected by construction activities. However, mitigation measures in the AFC would provide for testing and data recovery. Therefore, there would be no significant impact to cultural resources.

8.3.2.2 Historic Architectural Resources

The analysis presented within the AFC was reviewed to assess the potential effects to historic architectural resources resulting from implementation of the upland cooling system.

To determine the potential effects of the cooling tower system project on the two warehouses at 435 23rd Street, the analysis presented within the AFC was used. The new cooling tower required for the upland cooling system would be constructed within the Potrero PP site, across 23rd Street (north) from these two buildings. The design of the cooling tower is of a scale that is consistent with the existing structures of the plant and neighboring industrial development and thus would not materially impair the physical characteristics that convey the significance of the two warehouses at 435 23rd Street. As such, there would be no adverse effects to these two historic properties.

8.3.3 MITIGATION MEASURES

Although the Gibbon's Powder Magazine may be affected by this new project configuration, the mitigation measures outlined within the AFC including CULT-1 (Testing) and CULT-2 (Data Recovery) would provide for the resource's proper treatment.

It should be reiterated that structures or paved surfaces currently occupy the locations where the various project components would be constructed. Areas requiring archaeological testing are therefore not currently accessible. These areas would be accessible for various levels of testing, however, upon completion of necessary demolition, and prior to construction. At that time, the testing plan developed for the AFC would be implemented and borings would be used to assess subsurface cultural materials. Should intact materials be found, a more detailed research design would be completed and used to guide a thorough testing and evaluation program. The need for data recovery, monitoring or other appropriate mitigation measures would be determined following completion of the evaluation program.

8.3.4 REFERENCES

Hayes, Mick and Mark Hylkema, 1989. Archaeological Survey Report, Proposed Construction of South-bound On-ramp on the West Side of I-280, 04-SFR-280 P.M. 5.4/5.5 136-04220-395750. Caltrans District 4, Oakland.

Science Applications International Corporation (SAIC), 2000. Phase 1 Archaeological Survey Along Onshore Portions of the Global West Fiber Optic Cable Project. Submitted to Global Photon Systems, Inc.

Wirth Associates, 1979a. Potrero 7: Phase I Cultural Resources Overview and Inventory. Report submitted to Pacific Gas & Electric Company, San Francisco.

Wirth Associates, 1979b. Potrero 7: Phase II Archaeological Test Excavations. Report submitted to Pacific Gas & Electric Company, San Francisco.

8.4 LAND USE

This section inventories existing land uses in the vicinity of the facilities associated with the proposed upland cooling tower system. This section uses land use information that was described in the AFC. As a part of the AFC, land uses were described within one mile of the Potrero PP Unit 7 site and within one-quarter mile of the proposed transmission cable line. All cooling tower system components are contained within these previous survey boundaries.

Planned development and land use trends in the area of the upland cooling system were identified in the AFC. Reasonably foreseeable future development projects within the affected area were noted. Based on the previous analysis, the potential land use impacts associated with the cooling tower system were assessed. The conformance of the cooling tower system with local plans and regulations, and its compatibility with general land uses in the area, were also evaluated.

8.4.1 AFFECTED ENVIRONMENT

The affected environment evaluated in the AFC includes the area within which the cooling tower system would be developed. No additional land use survey was required. Zoning designations, general plan designations, governmental jurisdictional boundaries, and existing land uses are shown in Figure 8.4-1.

8.4.1.1 Existing Land Uses and Proposed Land Uses

The area is dominated by light/heavy industrial and commercial uses, with residential and commercial uses located to the west of 3rd Street. Businesses in the vicinity include shipping piers and dry dock facilities along the waterfront; vehicle storage and impoundment yards to the north; gas stations, warehouses, factories, small commercial businesses, and residences to the west; and rail yards, trucking companies, commercial and industrial businesses to the south. The residential housing is located approximately 500 feet to the west. Existing land uses and zoning designations for the project components are listed in Table 8.4-1 and explained below. Figure 8.4-1 shows the existing land uses surrounding the Potrero PP project with the cooling tower system.

The proposed wet/dry cooling tower, recycled water treatment plant, and converted recycled water storage tank components of the project are within the existing Potrero PP site. Potrero PP is surrounded by industrial uses to the north, west, and south and by the Bay to the east. The site is bounded on the north by 22nd Street and by a paved parking lot, by 23rd Street to the south, and by PG&E property fronting Illinois Street to the west. The proposed wet/dry cooling tower would be constructed along 23rd Street, in the central portion of the

Potrero PP, and would require the demolition/relocation of several buildings within the site. The recycled water treatment plant would be constructed in the interior of this site, north of the cooling tower. The recycled water tanks are on the Potrero PP site and require cleaning and minor modifications.

The secondary effluent pump station to convey water between the SEWPCP and Potrero PP would be located on the south side of Davidson Avenue, in a paved parking area between Rankin Street and Quint Street. This property is currently owned by SEWPCP. The SEWPCP Flynn Pumping Station is located to the west, an automobile salvage yard is located to the east, and an abandoned railroad right-of-way to the south.

As described in Section 2.0, Project Description, the proposed pipeline right-of-way would be partially in roadways and partially in an existing underground sewer overflow transport. The majority of land uses along the pipeline consist of industrial businesses.

An off-site laydown area is necessary due to the loss of space at the Potrero PP to the upland cooling tower system. Currently, two locations are under consideration. For purposes of this analysis, the location that is farthest from the project site has been analyzed. This location consists of 10 acres of land on Pier 96 at the eastern end of Cargo Way. This site is currently vacant and undeveloped. Vehicles travelling between the Potrero PP site and this laydown area would use Cargo Way, 3rd Street, 23rd Street, and Illinois Street.

8.4.1.2 Potential Sensitive Land Uses

As indicated in the AFC, potentially sensitive land uses within the affected environment include residential areas, schools, parks, churches, and a library. The residences closest to any component of the upland cooling system are located approximately 500 feet west of the Potrero PP at the 22nd Street/3rd Street intersection. The area between one-quarter mile and one mile northwest, west, and southwest of Potrero PP and the pipeline are highly urban and consist of a variety of mixed uses, including residential, retail, office, and commercial uses. Of the six churches, four schools, and one library originally identified within the affected environment in the AFC, none are adjacent to the upland cooling tower system. Figure 8.4-1 shows the existing land uses surrounding the Potrero PP Unit 7 project and cooling tower system facilities.

8.4.1.3 Zoning

The area where the components of the proposed cooling system would be placed is zoned Heavy Industry M-2. The cooling tower system is a permitted use in this zone.

Potrero PP is in a 40-X height and bulk district. This district allows structures to be built to a height of 40 feet, with unlimited bulk. The upland cooling system is exempted from the height requirement of 40 feet by Section 260(b) of the CCSF Planning Code, which exempts structures and equipment necessary for industrial plants and public utilities where such structures and equipment do not contain separate floors (CCSF, 1999). Thus, the design of the upland cooling system and its affiliated off-site facilities are consistent with CCSF Planning Code.

The recycled water tanks, secondary effluent pumping station, and pipeline are other permitted uses in the Heavy Industry M-2 zoning district and are exempted per Section 260(b) of the CCSF Planning Code described above.

The laydown area element of the cooling tower system is a permitted use in the Heavy Industry M-2 zoning code, as no new permanent structures would be constructed. This area would be used for the storage of construction materials and power plant equipment during the Unit 7 and cooling tower system construction process. Once construction is complete, this area would no longer be used for Potrero PP purposes. This use is consistent with CCSF Planning Code.

8.4.1.4 Land Ownership Patterns

Appendix B lists the names and addresses of the owners of the property within 500 feet of the proposed pipeline. Property owners around the Potrero PP are identified in the AFC.

8.4.1.5 Land Use Plans and Policies

Applicable federal, state, and local land use plans and policies are discussed below.

8.4.1.5.1 Federal

No applicable federal land use plans or policies have been identified.

8.4.1.5.2 State

A portion of the pipeline alignment crosses under I-280 along Cesar Chavez Street and Davidson Avenue. This portion of the proposed cooling tower system would entail placing the pipeline in an existing sewer overflow transport under the freeway. Since the sewer overflow transport is within California Department of Transportation (Caltrans) right-of-way, an encroachment permit would be required from Caltrans.

8.4.1.5.3 Local

Upland Cooling System and Recycled Water Tanks at Potrero PP

The Potrero PP is located in the Showplace Square-Potrero Hills Community Plan Area of the Central Waterfront Neighborhood Plan of San Francisco. The local land use plans and policies applicable to this site were evaluated in the AFC. A steam power plant and its affiliated off-site facilities were found to be consistent with both the Showplace Square-Potrero Hills Community Plan Area as well as CCSF Planning Code in Heavy Industry M-2 districts. No further evaluation is necessary.

Secondary Effluent Pumping Station

The secondary effluent pumping station is located within the South Bayshore Community Plan Area of the Central Waterfront Neighborhood Plan of San Francisco. This element of the cooling tower system is required for the completion of this utility project and is therefore considered consistent with CCSF Planning Code. Also, this project element would be constructed adjacent to the existing SEWPCP Flynn Pumping Station and is consistent with its surroundings. No impacts with the plans and policies of this community plan area are anticipated as the proposed area for the secondary effluent pumping station is anticipated to be relatively small, approximately 240 square feet. No further evaluation is necessary.

Pipeline

The pipeline alignment crosses from the Showplace Square-Potrero Hills Community Plan Area to the South Bayshore Community Plan Area of the Central Waterfront Neighborhood Plan of San Francisco. Because this component of the cooling tower system would be constructed below ground, no impacts with the plans and policies of the community plan areas are anticipated. No further evaluation is necessary.

Laydown Area

The laydown area is not included within a community plan area of the Central Waterfront Neighborhood Plan of San Francisco. No new structures would be built at the laydown area. Construction materials and power plant equipment would be marshaled here during the construction of the project. No further evaluation is necessary.

8.4.2 ENVIRONMENTAL CONSEQUENCES

This section evaluates the potential environmental consequences of both the construction and the operation of the proposed cooling tower system.

8.4.2.1 Construction-Related Impacts

8.4.2.1.1 Upland Cooling System and Recycled Water Tanks at Potrero PP

Construction activities associated with the cooling tower, recycled water treatment plant, and conversion of the two existing fuel tanks for recycled water use would take place in such a way as to minimize interference with power generation at the Potrero PP and with adjacent industrial/commercial activities along Illinois Avenue. The site for the proposed upland cooling tower is approximately 673 × 62 feet on the existing Potrero PP site. This constitutes a relatively small portion of the overall Potrero PP. The recycled water treatment plant would occupy approximately 0.6 acre.

Overall, the land use impacts associated with cooling tower system construction activities at the Potrero PP site would be less than significant because the activities are compatible with the existing area land uses, they expand the use of an existing industrial area, and the construction time period for the cooling tower system is temporary.

8.4.2.1.2 Secondary Effluent Pumping Station

Construction activities associated with the secondary effluent pumping station would take place in such a way as to minimize interference with the existing SEWPCP Flynn Pumping Station. The site for the proposed secondary effluent pumping station is approximately 10 × 24 feet and is located immediately east of the SEWPCP Flynn Pumping Station. More than adequate space is available in the parking lot for the construction of the pumping station as well as the staging of construction material.

Overall, the land use impacts associated with secondary effluent pumping station would be less than significant because the activities are compatible with existing area land uses, they expand the use of an existing industrial area, and the construction time period is temporary.

8.4.2.1.3 Pipeline

Construction activities associated with the pipeline will take place in such a way as to minimize interference with industrial/commercial activities along 23rd Street, Tennessee Street, 26th Street, Indiana Street, Cesar Chavez Street, Davidson Avenue, Quint Street, Rankin Street, and Evans Avenue. To minimize the disturbance caused by the construction, the pipeline would be buried under existing roadways and placed in an underground sewer overflow transport. Construction activities would impede traffic and access along portions of the proposed alignment because one lane of the road would be closed off in sections during the construction process. However, construction activities would be phased and mitigation incorporated to minimize the impacts to traffic and access to the extent practicable. The

majority of land uses along the proposed pipeline are industrial. In addition to traffic congestion, businesses along the proposed alignment may experience short-term impacts such as visual disruption, increased noise and dust, and increased vehicle emissions due to construction equipment. These issues are addressed in their respective sections of this amendment.

Open trench construction would be required to install certain sections of the pipeline in area roadways. The open trench would be 7 feet deep and 5 feet wide. Other sections would be installed within the existing sewer overflow transport or within existing concrete pipe trenches or galleries.

Overall, the land use impacts associated with the pipeline would be less than significant because the pipeline would be placed below ground, it is consistent with local land use plans and policies, and the construction time period is temporary.

8.4.2.1.4 Laydown Area

No new construction would occur at the laydown area. The laydown area would be used for marshalling construction materials and power plant equipment during the construction of Unit 7 and the upland cooling system. However, the transportation of construction materials and power plant equipment from the proposed laydown area to the Potrero PP site could potentially impact local roadways (23rd Street, Illinois Avenue, and 3rd Street) by increasing congestion (see Traffic and Transportation). This impact is considered to be less than significant to area land uses as the number of additional vehicles in the area is a minor overall increase and the construction schedule is temporary—approximately 24 months for the entire project.

8.4.2.2 Operations-Related Impacts

The proposed upland cooling tower system is intended to support the operation of the Potrero PP and be designed for an operating life of a minimum of 40 years. The project represents further development of a site already committed to energy-related use rather than the introduction of an industrial use to a non-industrial area. The proposed cooling tower system is compatible with adjacent land uses as evidenced by the current development pattern where the Potrero PP exists within a larger area dominated by commercial/industrial land uses. The operation of the Potrero PP and its affiliated offsite facilities are not expected to result in significant adverse impacts to surrounding land uses.

8.4.2.3 Compatibility with Existing and Proposed Land Uses

The cooling tower system involves the addition of power plant equipment to a site already committed to energy production. The system would not result in a change of land use, nor would it change the existing character of the area. The cooling tower system would be consistent with the existing uses at the Potrero PP site.

The operational impact of Potrero PP on the affected environment's land uses was evaluated in the AFC. It was determined that the Potrero PP was considered compatible with the surrounding land uses, both residential and non-residential. The most significant change in this amendment is the addition of the upland cooling system, with its tower approaching 69 feet in height. The nature of the cooling tower system is consistent with the surrounding industrial environment.

8.4.2.4 Consistency with Existing Land Use Plans, Policies, and Regulations

The wet/dry cooling tower, recycled water treatment plant, and recycled water storage tank components of the cooling tower system are located in the Heavy Industry M-2 CCSF zoning district and are consistent with CCSF Planning Code. A steam power plant and its affiliated offsite facilities are a permitted use in the M-2 district. Power plants are exempted from height restrictions by Section 260(b) of the CCSF Planning Code. Thus, implementation of the cooling tower system is consistent with planning and zoning designations for the site.

The CCSF zoning designation for the area of the secondary effluent pumping station, pipeline, and laydown area are also Heavy Industry M-2. Utility installations are permitted uses in the M-2 district "provided that operating requirements necessitate location within the district" (CCSF, 1999). The secondary effluent pumping station, pipeline, and laydown area are necessary elements of constructing and/or operating the upland cooling system and are considered as part of the utility installation.

As discussed in the AFC, enhancement of the Potrero PP site is consistent with the applicable policies established in the CCSF Master Plan, Bay Conservation and Development Commission's (BCDC) planning goals and policies for the Central Waterfront Area, the applicable policies established by the Port of San Francisco, and the San Francisco Central Waterfront Community Land Use Recommendation Report that was prepared by the Potrero Central Waterfront Committee (a community organization). The cooling tower system does not change its land use designation or basic operation. No violation of existing land use plans, policies, or regulations would occur.

8.4.3 CUMULATIVE IMPACTS

According to San Francisco planning staff, no planned or proposed developments in the area would generate cumulative land use impacts (Chinn, 1999). No other energy-related projects within one mile of the Potrero PP Unit 7 and the cooling tower system facilities were identified. This conclusion is unchanged with the upland cooling tower system.

8.4.4 MITIGATION MEASURES

Although no significant land use impacts are identified, the mitigation measures proposed in the AFC would be implemented to reduce project-related impacts to land use.

8.4.5 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable laws, ordinances, regulations, and standards evaluated in the AFC remain applicable to the cooling tower system.

8.4.6 REQUIRED PERMITS AND PERMIT SCHEDULES

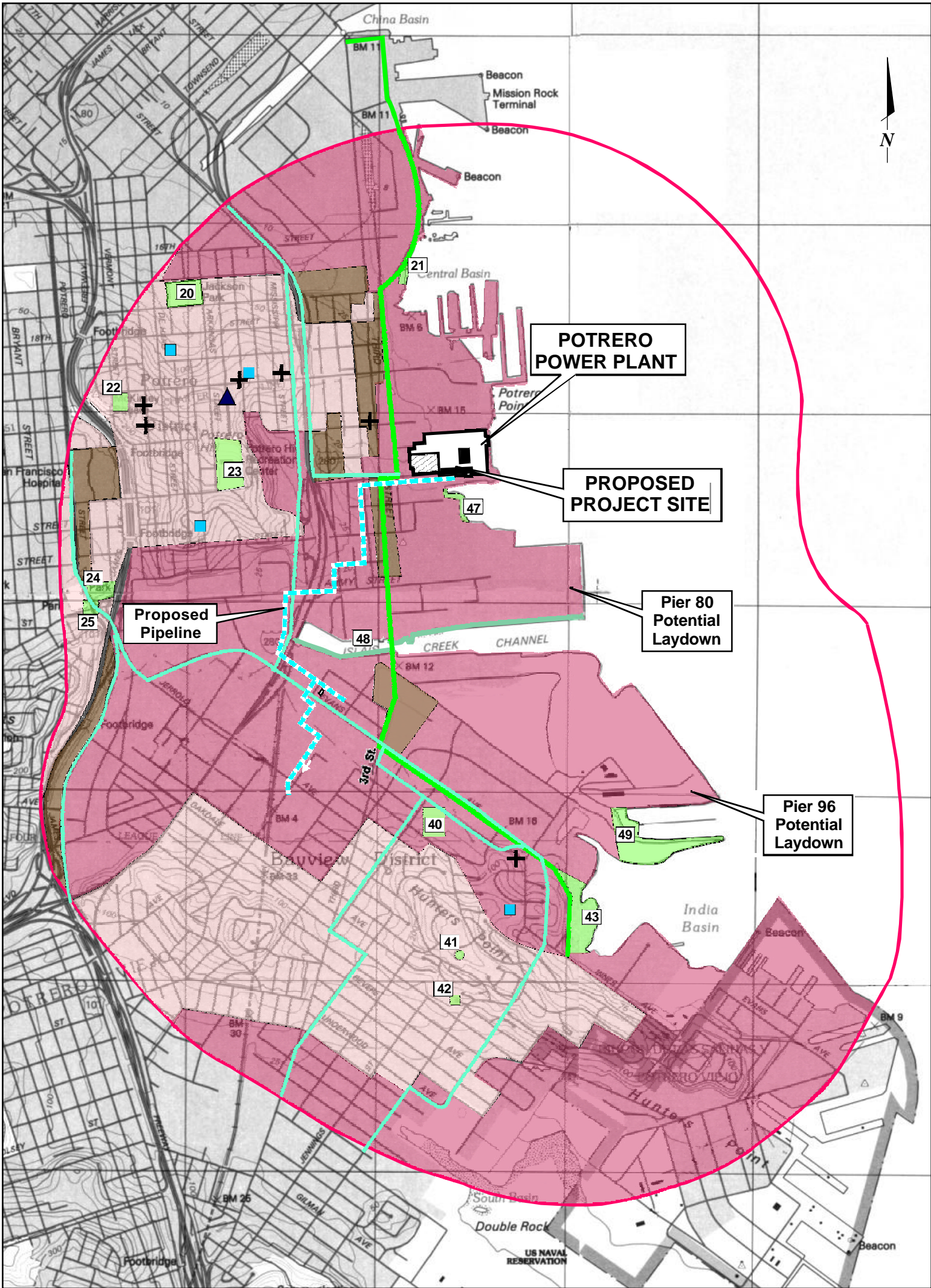
Responsible Agency	Permit/Approval	Schedule
Caltrans	Encroachment Permit	

8.4.7 REFERENCES

Chinn, Alton, 1999 and 2000. City and County of San Francisco (CCSF), Department of City Planning. Written and telephone communication with J. Smith (Radian).

CCSF, Department of City Planning, 1999. CCSF Planning Code.

Table 8.4-1 Existing Land Uses and Zoning Designations within the Affected Environment		
Project Feature	Existing Land Use	Zoning
Upland Cooling System and Recycled Water Tanks at Potrero PP	Power Plant	Industrial
Project Vicinity of Potrero PP	Industrial	Industrial
	Commercial	Neighborhood Commercial
	Residential	Residential – House Character
	Public Land	Public
Secondary Effluent Pumping Station Location	Industrial	Industrial
Secondary Effluent Pumping Station Vicinity	Industrial	Industrial
Water/Fiber Optic Cable Pipeline Route	Industrial	Industrial
	Residential	Residential – House Character
	Public Land	Public
Water/Fiber Optic Pipeline Vicinity	Industrial	Industrial
	Residential	Residential – House Character
	Public Land	Public
Laydown Area	Dock	Industrial
Laydown Area Vicinity	Industrial	Industrial
	Residential	Residential – House Character
	Public Land	Public
Source: CCSF Master Plan (1988) and CCSF Planning Code (1999)		



Source: USGSTopographicMaps,7.5MinuteSeries
San FranciscoNorth,California,1993
San FranciscoSouth,California,1993
Oakland West, California,1993
Hunters Point, California,1993

0 2000 4000
Scale in Feet
1:24,000

LEGEND

- Industrial
- Commercial
- Residential
- OpenSpace/Park
- School
- Church
- Library
- Proposed San Francisco Bay Trail
- Existing Power Distribution Lines

- 43 Park or RecreationArea:
- 20 Jackson Park
 - 21 Aqua Vista Park
 - 22 McKinley Square
 - 23 Potrero Hill Recreation Center
 - 24 Potrero DelSolPark
 - 25 Rolph Playground
 - 40 Youngblood Coleman Playground
 - 41 HilltopPark
 - 42 Adams Rogers Park
 - 43 India Basin Shoreline Park
 - 47 Warm Water Cove
 - 48 Islais Creek Open Space
 - 49 Herons Head Park

EXISTING LAND USES WITHIN ONE MILE
OF THE POTRERO POWER PLANT
AND RELATED FACILITIES



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FIGURE8.4-1

8.5 NOISE

This section describes the existing noise environment on site and in the vicinity of the plant, and assesses potential noise impacts associated with the project with the cooling tower system. Noise-sensitive receptors that may be affected by noise are identified. The following discussion describes the results of a detailed site reconnaissance, sound level measurements, acoustical calculations, and assessment of potential noise impacts. The permitted sound level at the project property line is 75 dBA at any time.

8.5.1 AFFECTED ENVIRONMENT

8.5.1.1 Plant Site

The land uses surrounding the Potrero PP are generally commercial and industrial with some residential. The predominant noise sources include vehicular traffic (automobiles and medium and heavy trucks) and industrial noise from mechanical equipment and processes.

Some land uses are considered sensitive to noise. Noise-sensitive receptors are land uses associated with indoor or outdoor activities that may be subject to stress or significant interference from noise. They often include residential dwellings, and high-density or high-occupancy uses such as mobile homes, hotels, motels, hospitals, nursing homes, educational facilities and libraries. Industrial and commercial land uses are generally not considered sensitive to ambient noise.

Existing noise-sensitive receptors in the vicinity of the Potrero PP site include multi-family residences located on 3rd Street near 22nd Street, 22nd Street west of 3rd Street, Tennessee Street, and in the Potrero Hill neighborhood west of I-280. Sound levels at these receptors are a function of their proximity to roadways and existing industrial noise sources. With the exception of the Potrero Hill neighborhood, the line-of-sight view from the residences to the Potrero PP is blocked by multi-story industrial buildings. Noise from the Potrero PP is not audible at any of these residences as a result of distance and the noise attenuating effects of the intervening industrial buildings. These were mapped in the AFC.

A multi-level live/loft/work building is located at the southwestern corner of the intersection of 23rd Street and Minnesota Street and is the closest residential receptor in line-of-sight to the Potrero PP. Noise from the plant was not audible at this location.

Sound Level Measurements

To document existing background noise, a series of sound level measurements were made on August 18 and 19, 1999 and on October 11 and 12, 1999. The measurement locations

were selected to quantify noise levels near the plant and to characterize noise sensitive receptors that may be exposed to sound level increases as a result of the project. These data are provided in the AFC.

8.5.1.2 Pump Station

The land use near the proposed pump station consists of industrial and commercial uses. There are no noise sensitive receptors in the vicinity of the pump station.

8.5.1.3 Pipeline

The land use along the pipeline route consists of industrial and commercial uses. A mixed-use multi-family residential building is located adjacent to the alignment at the intersection of Cesar Chavez Street and Indiana Street.

8.5.2 ENVIRONMENTAL CONSEQUENCES

Noise would be produced at the Potrero PP site during construction and operation of the project. Potential noise impacts from both activities are assessed in this section. To determine the significance of project-induced increases in noise levels, significance criteria were used. Impacts were considered significant if:

- Project construction activities would conflict with the City of San Francisco Municipal Code requirements.
- Project-generated operation noise would result in a substantial noise level increase at noise-sensitive locations; in this analysis, an increase of 5 decibels (dB) was considered significant.

8.5.2.1 Construction Impacts

8.5.2.1.1 Plant Site

Construction of the cooling tower system would result in a temporary increase in the ambient noise level near the activity. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the impact would depend on the type of activity, the noise level generated by various pieces of equipment, the duration of the construction, and the distance between the noise source and receiver. Sound levels from plant construction will typically range from 70 dBA to 90 dBA at 50 feet from the source (EPA, 1972). Noise from the construction was assumed to have point-source acoustical characteristics. Strictly speaking, a point source sound decays at a rate of 6 dB per

doubling of distance from the source-receiver pair. This is a logarithmic relationship describing the acoustical spreading of a pure, undisturbed spherical wave in air. The rule applies to the propagation of sound waves with no ground interaction. Acoustical calculations show that the sound level at the residential building at the southwestern corner of the intersection of 23rd Street and Minnesota Street would be approximately 42 to 62 dBA. However, partial shielding afforded by some structures would further reduce the noise level at this receptor. Construction and demolition noise is expected to comply with the City of San Francisco Municipal Code requirements. No significant impacts would occur.

8.5.2.1.2 Pump Station

Pump station construction would result in a short-term temporary increase in the ambient noise level near the construction activity. No noise-sensitive receptors are located near the pump station site. No significant impacts would occur.

8.5.2.1.3 Pipeline

Pipeline construction would result in a short-term temporary increase in the ambient noise level near the construction activity. Noise-sensitive receptors along the alignment are limited to the mixed-use multi-family residential building at the intersection of Cesar Chavez Street and Indiana Street. As a linear component, construction activity in this area would be limited to several days. Construction in this area would occur between the hours of 7:00 a.m. and 8:00 p.m. as required by the City of San Francisco Municipal Code. In addition, construction equipment would be selected and operated in compliance with the municipal code requirements. No significant impacts would occur.

8.5.2.2 Operations Impacts

8.5.2.2.1 Plant Site

The project would involve the introduction of the wet/dry cooling tower and the water treatment plant to the Potrero PP site. The overall noise level generated would depend upon the physical layout of the facility and the noise control measures incorporated into the facility design. Project noise control measures include an integrated noise barrier on the 23rd Street side of the cooling tower.

The Cadna A Noise Prediction Model was used to estimate the project-generated sound level on site. Cadna A is a Windows-based software program for the prediction and assessment of noise levels near industrial noise sources. The model uses industry-accepted propagation algorithms and accepts sound power levels (in decibels re 1 picroWatt) provided by the equipment manufacturer and other sources based on ISO 3740 standards.

The calculations account for sound wave divergence plus attenuation factors due to air absorption, basic ground effects, and barrier/shielding. Air absorption was under “standard day” conditions of 59° F and 70 percent relative humidity. The site and surrounding areas were assumed flat. However, major buildings, tanks, and large equipment were included as barriers.

Calculations were performed using linear octave band sound power levels as inputs from each noise source. The model outputs are in terms of octave band and overall A-weighted sound pressure levels. The modeled noise sources included the proposed wet/dry cooling tower, the 7FA turbine package modeled for the proposed Unit 7 Project, and the existing Unit 3. Equipment from the proposed water treatment plant was not modeled because that equipment would be shielded from the property lines by larger, higher noise-generating equipment. Source sound levels from the 7FA turbine package are summarized in the AFC. Modeled sound level from the proposed wet/dry cooling tower is 83.6 dBA at 30 feet on the three open sides and 73.8 dBA at 30 feet on the closed side (an integrated noise barrier) facing 23rd Street. Modeled sound levels from the existing Unit 3 were based on sound level measurements at the 23rd Street property line and ranged from 71 to 75 dBA. Sound pressure levels presented were converted into sound power levels. The project site configuration was from project CAD files. The plant was assumed to operate 24 hours per day, which means that its noise output would be constant regardless of the time of day.

Noise contours in 5 dBA increments are depicted in Figure 8.5-1. A review of the figure shows that the sound level from the proposed project would be 75 dBA or below at the property line.

The Cadna A model was also used to estimate the sound level at the noise-sensitive receptors, identified as ML1 and ML4 on Figure 8.5-2. ML1 is located approximately 1,200 feet from plant, and is the closest noise-sensitive receptor that would have a direct line-of-sight to the plant. ML4 is located approximately 2,400 feet from the plant, and is representative of the Potrero Hill neighborhood, which has a view of the plant. Intervening buildings and/or topography block the line-of-sight to all other noise-sensitive receptors. As a result, those receptors are significantly shielded from the plant and are not exposed to the plant noise.

Based on the above assumptions, the estimated sound levels at ML1 and ML4 are summarized in Table 8.5-1. The table shows the measured nighttime hourly L_{eq} , the project sound level, and the cumulative sound level (project plus ambient sound level). A review of the table shows that the proposed project may increase the sound level at ML1 and ML4 by only 1 dBA. Sound variations of 3 dBA are considered just perceivable by the typical human ear. No noise-sensitive receptors would be affected by a 5-dBA increase by the proposed

project; therefore, the proposed project would not result in a significant impact to noise-sensitive receptors.

Worker Effects

The Occupation Safety and Health Administration (OSHA) and the California OSHA (Cal/OSHA) regulate occupational exposure to noise. The standard stipulates that protection against the effects of noise exposure shall be provided when sound levels exceed 90 dBA over an 8-hour exposure period. The employer must institute a Hearing Conservation Program whenever employee noise exposure equals or exceeds the Action Level of an 8-hour time-weighted average (TWA) sound level of 85 dBA. Sound levels would exceed the OSHA 85 decibel threshold for action within 3 feet of the cooling tower. Sound levels will attenuate at various rates when moving away from the noise source.

Occupational noise exposure of employees within the plant cannot be evaluated until the project has been constructed and employee jobs and routines determined. At that time, a noise evaluation will be conducted to ensure that employees are adequately protected in accordance with OSHA and Cal/OSHA.

8.5.2.2.2 Pump Station

Noise sources at the proposed pump station would be three 25-horse-power vertical barrel pumps. The pumps would be enclosed. The enclosure would be designed to limit noise from the pumps to 75 dBA at the property line as required by the municipal code. Therefore, the proposed project would not result in a significant noise impact.

8.5.2.2.3 Pipeline

Operation of the pipeline is not expected to generate noise; therefore, the proposed project would not result in a noise impact.

8.5.3 CUMULATIVE IMPACTS

The proposed project may result in an incremental noise increase in the vicinity of the project. Cumulative sound levels would be expected to comply with the Municipal Code and be consistent with the industrial nature of the surrounding land uses. Construction and operation of the proposed project would not result in a significant cumulative impact at any noise-sensitive receptor.

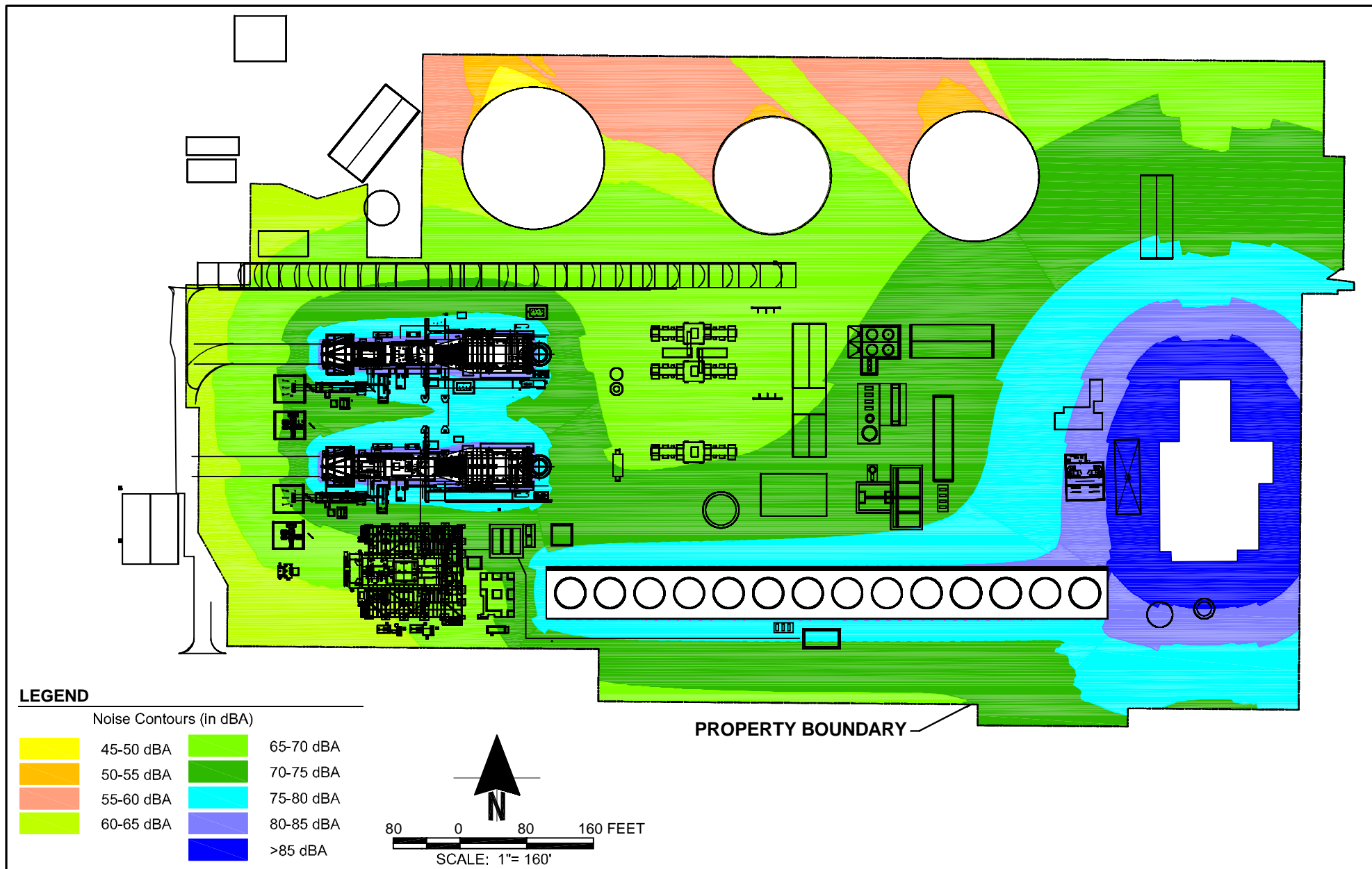
8.5.4 MITIGATION MEASURES

No significant impacts were identified; therefore, mitigation is not required.

8.5.5 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The LORS applicable to noise for the proposed project are summarized in the AFC. No additional LORS apply as a result of the cooling tower system.

Table 8.5-1 Nighttime Ambient Sound Level and Plant Design Sound Level				
Receptor	Source to Receptor Distance	Ambient Sound Level (L_{eq} h)^a	Project Generated Sound Level (L_{eq} h)[*]	Cumulative Sound Level (L_{eq} h)^b
ML1: Approximately 50 feet From the Intersection of 23 rd Street and Minnesota Avenue	1,200 feet	56 dBA	49 dBA	57 dBA
ML4: Approximately 50 feet from the Intersection of 22 nd and Missouri Street	2,400 feet	50 dBA	43 dBA	51 dBA
<p>Notes:</p> <p>* Proposed project, 7FA package, and Unit 3.</p> <p>^a Lowest measured nighttime hourly equivalent sound level (L_{eq})—the energy mean a-weighted sound level.</p> <p>^b Project plus measured ambient sound level.</p> <p>dBA = A-weighted decibels</p> <p>The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees. The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.</p>				



CALCULATED NOISE CONTOURS

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FIGURE 8.5-1

8.6 PUBLIC HEALTH

This analysis of public health impacts addresses the addition of the on-site recycled water treatment plant and the wet/dry cooling tower to the project. This change introduces two new air pollution sources that have the potential to affect public health — the cooling tower itself and an odor control system vent. Potential emissions of hazardous air pollutants (HAPs) from both of these new sources are analyzed for impacts to public health. No air pollution sources were associated with the once-through cooling system; therefore, no sources were deleted from the analysis.

The assessment of the cooling tower system's potential impact on public health is made through a human health risk assessment. The methodology for conducting the analysis of the cooling tower system was consistent with the methodology described in the AFC. This section contains the results of the human health risk assessment (HRA) prepared for the Potrero PP Unit 7 project with a cooling tower system, which evaluates potential public exposure to pollutant emissions from routine project operations. Potential public exposure during upset conditions is addressed in Section 8.12, Hazardous Materials Handling.

8.6.1 AFFECTED ENVIRONMENT

The public health impact assessment for the Potrero PP Unit 7 with the upland cooling tower system used the identical local environment used in the AFC.

8.6.2 ENVIRONMENTAL CONSEQUENCES

This section describes the potential public health risks due to operation of the cooling tower system, and the methodology and results of the HRA. For purposes of this analysis, significant impacts are defined as a maximum incremental cancer risk greater than 1 in one million, a chronic total hazard index over 1 or an acute total hazard index over 1. The results of the assessment show that the maximum incremental cancer risk from the project with the cooling tower system would be 0.9 in one million. This is below the significant incremental cancer risk level of 1.0 in one million. The results of the assessment also show that the chronic total hazard index and the acute total hazard index are 0.1419 and 0.5157, respectively. These indices are well below the significance criteria of 1.0.

8.6.2.1 Public Health Impact Assessment Approach

The approach used to assess the public health impacts from the project with the cooling tower system was identical to the approach used in the original AFC.

Descriptions of the model input parameters and results of the HRA are given in Section 8.6.2.4.

8.6.2.2 Construction Phase Emissions

Due to the relatively short duration of the construction of the project (i.e., 24 months), significant long-term public health effects are not expected. To ensure worker safety during actual construction, safe work practices will be followed. An analysis of the potential environmental impacts due to criteria pollutant emissions during construction and control of these emissions is discussed in Section 8.1.2, Air Quality: Environmental Consequences.

8.6.2.3 Operational Phase Emissions

Operations of the new cooling system facilities were evaluated to determine whether particular substances would be used or generated that may cause adverse health effects if released to the air. The potential emissions from the cooling tower include trace amounts of metals contained in the water droplets that escape from the mist eliminators as "drift" losses. The substances emitted from the cooling tower operations with potential toxicological impacts are shown in Table 8.6-1.

The potential emissions from the odor control system tower include trace amounts of volatile organic compounds that escape from the air pollution control device. Emission rates assume that the granular activated carbon (GAC) bed will capture 50 percent of the entering pollutants. The substances emitted from the cooling tower operations with potential toxicological impacts are shown in Table 8.6-2.

As discussed in the AFC, worst-case or most conservative estimates of annual turbine emissions were made by assuming that both turbines would operate simultaneously under full load conditions (100 percent load at 80°F annual average) and full duct burner firing rate for the entire year. This is a conservative assumption as discussed in the AFC. The reduction in annual emissions from the turbines that would be associated with the emission reduction request (see Section 8.1, Air Quality) was not considered in this analysis of the cooling tower system alternative. Rather, the original public health impacts from turbine operations were used. This provides an even more conservative assessment of annual ground level impact from the gas turbines for use in this risk analysis.

8.6.2.4 Model Input Parameters

The HRA was conducted using worst-case cooling tower and odor control system (short- and long-term) emission rates. Cancer and chronic noncancer health effects were estimated using the annual emission estimates. Acute noncancer health effects were

estimated using the worst-case maximum hourly emissions. The maximum hourly and annual emissions in lb/hr were converted to grams per second (g/s) for use as input to the ACE2588 model.

The dispersion models and risk assessment model used and the receptor locations analyzed were unchanged from the AFC.

8.6.2.5 Calculation of Health Effects

The cancer and non-cancer health effects were calculated for the emissions from the cooling tower and the odor control system. These were then added to the health effects from the emissions from the gas turbines as reported in the AFC. This is a conservative approach because the location of the maximum impacts from the turbines and the two new sources would not coincide.

8.6.2.6 Health Effects Significance Criteria

Various state and local agencies provide different significance criteria for cancer and noncancer health effects. For the project, the CEC guidelines provide the most stringent significance criteria for potential cancer and noncancer health effects from project-related emissions. For carcinogenic health effects, an exposure is considered potentially significant when the predicted lifetime cancer risk exceeds one in one million (1.0×10^{-6}). For noncarcinogenic health effects, an exposure that affects each target organ is considered potentially significant when the Total Health Index (THI) exceeds a value of 1.

8.6.2.7 Estimated Lifetime Cancer Risk

The maximum change in cancer risk resulting from project emissions (turbines plus upland cooling system sources) was estimated to be 0.9 in one million. The maximum change in cancer risk was located near the northeastern facility boundary of the Potrero PP site at ground level (receptor located at 4,179,017 m north, 554,808 m east). The location of this maximum was unchanged from the location as shown in the AFC. Table 8.6-3 presents the detailed cancer results of the HRA for the project operations. Applicable excerpts of the ACE2588 model output can be found in Appendix C.

The estimated cancer risks at all locations are below the significance criteria of 1 in one million. Thus, the project emissions would pose no significant health effects relative to the most stringent significance criteria established for carcinogenic health effects.

8.6.2.8 Estimated Chronic and Acute Total Hazard Indices

The maximum chronic THI resulting from the cooling tower system emissions was estimated to be 0.1419. The maximum chronic THI was located near the northeastern facility boundary of the Potrero PP site at the elevation of the plant (the receptor is located 4,179,017 m north, 554,808 m east). This location is a commercial/industrial setting. The maximum acute THI resulting from project emissions was estimated to be 0.5157. The locations of the chronic and the acute THI were unchanged from the locations reported in the AFC. Table 8.6-3 presents the detailed noncancer results of the HRA for the project with a cooling tower system. The estimated chronic and acute THIs are well below the significance criterion of 1. Thus, the project emissions would pose no significant health effects relative to the most stringent significance criteria established for noncarcinogenic health effects.

8.6.3 CUMULATIVE IMPACTS

Risks from the project are evaluated on their own and then compared to the applicable significance criteria. The cumulative effects from sources other than the project are not considered.

8.6.4 MITIGATION MEASURES

The criteria pollutant emissions are mitigated through the use of Best Available Control Technology (BACT) and through emissions offsets. A complete discussion of these is included in Section 8.1, Air Quality. Therefore, further mitigation of criteria pollutant emissions is not required to protect public health.

The toxic pollutant emissions would be minimized by the use of cooling tower mist eliminators that have a drift rate that meets BACT, and by the granular activated carbon bed of the odor control system.

8.6.5 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicable laws, ordinances, regulations, and standards (LORS) related to public health impacts from the project with a cooling tower system are identical to those identified in the AFC.

8.6.6 INVOLVED AGENCIES AND AGENCY CONTACTS

Agency contacts regarding public health assessment of the project with a cooling tower system are unchanged from the AFC.

8.6.7 PERMITS REQUIRED AND PERMIT SCHEDULE

This section lists the required permit related to Public Health for the alternative cooling system. The permit is summarized in the following table.

Responsible Agency	Permit/Approval	Schedule
Bay Area Air Quality Management District (BAAQMD)	Authority to Construct/Permit to Operate	Application to be filed concurrent with AFC. 45-day application review period.

Table 8.6-1 Hazardous Air Pollutant Emissions from Cooling Tower				
Water Rate	140000	gpm		
Drift Rate	0.0005	%		
Number of Cells	14			
			Emission Rate	
Maximum Concentration			lb/hr	g/s/cell
Chromium	6.5	µg/L	2.28E-06	2.05E-08
Copper	72.5	µg/L	2.54E-05	2.29E-07
Lead	0.0935	µg/L	3.28E-08	2.95E-10
Mercury	19.5	µg/L	6.84E-06	6.16E-08
Nickel	12.5	µg/L	4.38E-06	3.95E-08
Selenium	2.5	µg/L	8.77E-07	7.90E-09
Zinc	312	µg/L	1.09E-04	9.86E-07

Table 8.6-2 Hazardous Air Pollutant Emissions from Odor Control System				
Compound	lb/yr/mgd	lb/year	lb/day	gm/sec
Total VOC	190	446.50	1.22	6.43E-03
Benzene	1.7	4.00	0.01	5.75E-05
Ethyl Benzene	1.2	2.82	0.01	4.06E-05
Toluene	7.3	17.16	0.05	2.47E-04
Xylenes	7	16.45	0.05	2.37E-04
1,1,1 TCA	6.5	15.28	0.04	2.20E-04
Chloroform	4.7	11.05	0.03	1.59E-04
Methylene Chloride	4.3	10.11	0.03	1.45E-04
Tetrachloroethylene	8.5	19.98	0.05	2.88E-04
Acetone	3.20E-02	7.52E-02	2.06E-04	1.08E-06
Methyl Ethyl Ketone	6.40E-03	1.50E-02	4.12E-05	2.17E-07
Methyl Isobutyl Ketone	5.80E-03	1.36E-02	3.73E-05	1.96E-07
Notes: 1. Assumes annualized usage of 4.7 million gallons of water treated per day and 365 days per year. 2. Assumes Granular Activated Carbon (GAC) bed control efficiency of 50 percent.				

Table 8.6-3
Estimated Cancer Risk and Acute and Chronic Total Hazard Indices

Source	Cancer Risk at Maximum Point of Impact (Excess risk in one million)	Chronic Risk at Maximum Point of Impact (Total Hazard Index)	Acute Risk at Maximum Point of Impact (Total Hazard Index)
Turbines (see AFC)	0.658	0.1415	0.5141
Cooling Tower and Odor Control System	0.242	0.0004	0.0016
TOTAL	0.9	0.1419	0.5157

8.7 WORKER SAFETY AND HEALTH

This section describes the injury- and illness-prevention programs that would be established and implemented during construction and operation of the proposed project. The purpose of these programs is to protect human health and capital resources, and minimize the potential for workplace injuries and illnesses at the facility. The development and implementation of these programs will also ensure compliance with applicable laws, ordinances, regulations, and standards.

The programs identified in the AFC would apply to the construction and operation of the upland cooling tower system. These programs are identified in the AFC, and the detail is not repeated here. No additional programs are required by the construction and operation of the upland cooling system.

8.7.1 WORKPLACE DESCRIPTION

The upland cooling tower system would eliminate from the workplace the proposed intake and discharge structures and their associated ancillary features. The upland cooling system would add to the workplace the following:

- Wet/dry cooling tower
- Recycled water treatment plant
- Associated chemical storage, pumps, and piping
- Off-site pipeline and pump station
- Off-site laydown area (construction period only)

8.7.2 OCCUPATIONAL SAFETY AND HEALTH

Potential hazards that workers may be exposed to while working on these facilities are the same as those described in the AFC for the Unit 7 facilities. Worker exposure to these hazards would be minimized by adherence to appropriate engineering design criteria, implementation of appropriate administrative procedures, use of personal protective equipment, and compliance with applicable health and safety laws, ordinances, regulations, and standards.

8.7.3 INJURY AND ILLNESS PREVENTION PROGRAMS

Prior to beginning construction, the architect/engineering firm and construction contractor, in conjunction with Mirant, would develop site-specific construction injury and illness prevention programs, as described in the AFC.

These programs include:

- Construction Safety Program
- Construction Personal Protective Equipment Program
- Construction Exposure Monitoring Program
- Hazardous Materials Action Plan
- Construction Emergency Action Plan
- Construction Written Safety Programs

Upon completion of construction and startup, the construction illness and injury prevention programs will transition into an operations-oriented program that reflects the hazards and controls necessary during routine operations and maintenance of facilities. The existing Potrero PP program will be revised to reflect any unique hazards associated with the new facilities. These revised programs would then apply to the entire facility.

These programs include:

- Injury and Illness Prevention Plan
- Emergency Action Plan
- Hazardous Materials Management Program
- Personal Protective Equipment Program
- Operations and Maintenance Written Safety Programs

8.7.4 SAFETY TRAINING PROGRAMS

To ensure that employees recognize and understand how to protect themselves from hazards that exist at the Potrero PP, comprehensive training programs for construction and operations personnel would be implemented.

8.7.5 FIRE PROTECTION

During construction, onsite fire protection will be provided by existing Potrero PP fire protection services. To ensure a coordinated and efficient response to a fire emergency, the contractor, in conjunction with the Potrero PP fire/safety coordinator, will develop a Fire Protection and Prevention Plan. This will include general requirements, housekeeping, communications/alarms, fire extinguishing equipment, fire control, storage and handling of flammables/combustibles, and similar concerns.

Onsite fire suppression will be supported by the San Francisco Fire Department (SFFD). SFFD Station 25 is approximately 0.9 mil south of the facility, at 3rd and Cargo Way. Routine fire prevention inspections will be conducted by the SFFD.

During operations, fire protection and prevention will include measures to safeguard human life, prevent personal injury, preserve property, and minimize down time due to fire or explosion. It will principally involve physical arrangements, such as sprinkler systems, water supplies, and fire extinguishers. Facility fire protection is a responsibility of the SFFD. As such, fire suppression systems would be subject to review and approval by the SFFD. The SFFD would perform final inspection of the project when construction is complete, and would conduct periodic fire and life safety inspections thereafter.

8.7.6 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The LORS identified in the AFC as applicable to the Unit 7 Project are also applicable to the upland cooling system.

8.8 SOCIOECONOMICS

8.8.1 AFFECTED ENVIRONMENT

Socioeconomic issues relevant to analysis of the upland cooling tower system include labor force, employment and income; population and housing; public finance and fiscal issues; schools; and public services and utilities (including fire protection, emergency response services, law enforcement, schools, medical services and utilities). The AFC describes existing socioeconomic conditions in the project vicinity. Since the AFC was prepared, socioeconomic conditions have not changed in any way that could affect the impact analysis substantially. In general, the local and regional economy has worsened since the late 1990s, resulting in decreasing jobs and increasing unemployment in the San Francisco Bay Area, as well as worsening fiscal conditions for local government entities. Demographic data now available from the 2000 census indicate that the population residing in the project vicinity became more non-minority between 1990 and 2000.

The upland cooling system would be constructed on the existing Potrero PP property, except for a pump station and pipelines that would connect the facility with the SEWPCP that lies approximately 1.5 km southeast of the plant site. The pipeline route is in a predominantly industrial area, with large commercial, industrial, and warehousing uses on the north side of Cesar Chavez Street, except for one new loft development on the northwestern corner of the intersection of Indiana Street and Cesar Chavez Street. The area on the south side of Cesar Chavez Street is also predominantly industrial, with no residential uses along the route and a number of wrecking yards in the vicinity of the SEWPCP.

8.8.2 ENVIRONMENTAL CONSEQUENCES

8.8.2.1 Significance Criteria

The criteria used in determining whether project-related socioeconomic impacts would be significant, which are same as those used for the Unit 7 Project with the once-through cooling system, are based on guidance provided in Appendix G of the California Environmental Quality Act (CEQA).

8.8.2.2 Economy: Labor Force, Employment and Income

The AFC estimated that during the construction period of approximately 24 months, peak employment at the proposed project site—including construction of intake and discharge structures for the once-through cooling system—would be approximately 284 workers in month 17 and an average workforce of 158 during the two-year construction period. AFC

workforce projections have been revised to include the workforce required to construct the project, including the wet/dry cooling tower system. Table 8.8-1 shows the total estimated construction workforce for the Unit 7 project, including the various components of the wet/dry cooling tower system and excluding the construction workforce previously estimated for construction of the once-through cooling system. As this table shows, over the 24-month construction period there would be a peak workforce of 363 in month 14 and an average workforce of 173 over the two-year period. Given the large size of the construction labor force in the San Francisco Bay Area, no difficulty in filling these construction jobs is anticipated.

Operation and maintenance of the Unit 7 project, including the once-through cooling system, was estimated to require 10 employees in the AFC. Because operation of the wet/dry cooling system would require approximately the same manpower as the once-through cooling system, this estimate remains unchanged.

Since the construction and operation jobs and their associated income would be a beneficial impact to the local economy, no significant (adverse) impacts on local socioeconomic resources would be associated with the project labor force, employment, and income.

8.8.2.3 Population and Housing

Because of the size of the Bay Area labor force, including the construction sector, and the relatively small labor requirements of the wet/dry cooling system, no workforce relocation is anticipated as a result of the cooling tower system. Therefore, the project would have no impact on population and housing in the project area. The off-site pipeline construction would not affect local property values because it would be constructed through a predominantly industrial area, and it would not be visible after construction is completed.

8.8.2.4 Public Services and Utilities

Increases in demand for police, fire, emergency services, medical services, and utilities would not be significant, because no population relocation would occur as a result of the project. The presence of the construction workforce would be temporary, and the size of the operation workforce would be very small.

8.8.2.5 Fiscal Impacts

One-time school impact fees would be imposed on the project by the San Francisco Unified School District at the rate of approximately \$0.15 per square foot of heavy industrial development. The wet/dry cooling system and ancillary facilities would result in a net increase of approximately 60,000 square feet of industrial development, compared with the

once-through cooling system evaluated in the AFC. This would result in a fee of approximately \$9,000.

The City and County of San Francisco would levy property taxes on the assessed value of the completed development. In addition, state and local sales tax revenues would accrue as a result of local purchasing during construction and operation of the wet/dry cooling tower system. While these local revenues would be beneficial impacts, they would not be significant.

8.8.3 ENVIRONMENTAL JUSTICE

The upland cooling system and ancillary facilities would be constructed within three census tracts identified in the AFC—226, 227 and 609. In 1990, the percentage of the population that was identified as minority was 48, 24, and 34 percent, respectively, in comparison to the citywide rate of 53 percent. In the 2000 census, the percentage of minority residents in Census Tract 226 declined to 32 percent. Census Tract 227 was divided into three tracts (227.01, 227.02, and 227.03), with 22, 28, and 57 percent minority residents, respectively. In Census Tract 609, the percentage of minority residents increased to 60 percent in comparison to a citywide rate of 56 percent in 2000. However, Census Tract 609 is a relatively large tract. The area of Census Tract 609 that the project pipelines traverse is a heavy industrial area that has no residents.

Because the area affected by the project contains census tracts with varying levels of minority population that are not substantially higher than the citywide average percentage of minority residents, and because the pipeline construction would occur almost exclusively in non-residential areas of those census tracts, no Environmental Justice impacts would be associated with the proposed project.

8.8.4 MITIGATION MEASURES

The wet/dry cooling system would not result in any significant adverse socioeconomic impacts; therefore, no mitigation is recommended.

Table 8.8-1
Projected Monthly Manpower (by Craft)

CRAFT TYPE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Demolition Supervisor	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Laborers	9	10	12	22	22	19	22	24	14	15	13	17	17	17	18	14	14	15	10	6	4	3	3	3
Carpenters/Millwrights	0	2	10	18	28	21	26	24	37	53	49	51	46	46	30	12	5	1	1	0	0	0	0	2
Ironworkers	0	0	0	3	16	16	19	26	19	19	17	17	10	8	8	1	0	0	0	0	0	0	0	0
Heavy Equip Operator	9	10	7	13	8	6	2	7	0	0	0	2	6	7	9	5	4	2	0	0	0	0	0	0
Teamsters	3	7	8	7	8	8	7	7	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricians	0	0	1	3	5	7	10	8	20	25	25	36	39	69	77	79	63	46	28	24	14	9	6	3
Pipefitters	0	0	2	5	8	12	20	15	27	47	81	121	124	115	115	115	115	81	63	31	11	0	1	1
Boilermakers	0	0	0	0	0	0	0	3	11	20	25	32	39	39	40	40	40	25	25	5	0	0	0	0
Sheet Metal Workers	0	0	0	0	0	0	0	1	1	4	4	1	1	0	0	0	0	0	0	0	0	0	0	0
Insulators	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	7	18	17	16	16	13	8	4	3
Painters	0	0	0	0	1	1	1	0	0	0	2	2	2	4	5	6	11	11	5	3	2	0	1	1
Cement Finishers/Mason	0	1	2	3	6	7	5	4	6	5	7	6	4	3	3	5	0	0	0	0	0	0	0	0
Mechanics	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0
Surveyors	1	1	1	3	1	3	1	4	1	2	0	2	0	2	0	2	0	1	0	0	0	0	0	0
Divers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Craft Labor	23	33	45	78	104	101	114	124	140	194	227	288	288	315	310	286	270	199	149	86	45	21	15	13
Contractor Staff	8	12	17	21	23	27	27	35	31	41	45	47	47	48	47	44	41	35	29	24	20	12	7	3
Total Labor	31	45	62	99	127	128	141	159	171	235	272	335	335	363	357	330	311	234	178	110	65	33	22	16

8.9 AGRICULTURE AND SOILS

This section summarizes the potential impacts on agriculture and soils that could result from the construction and operation of the cooling tower system. The AFC addressed potential impacts to agricultural resources and soils that might result from Unit 7 construction. This amendment addresses only those additional impacts that could result from the new components of the cooling tower system.

Excavation of soils may encounter contaminated materials. Management of excavated materials would be conducted in accordance with a revised Site Mitigation and Implementation Plan (SMIP) that will be prepared in accordance with the requirements of Article 22A of the CCSF's Public Health Code (formerly called the Maher Ordinance), which governs development within filled lands adjacent to San Francisco Bay.

8.9.1 AFFECTED ENVIRONMENT

The cooling tower system would include an approximately 1.7-mile-long pipeline corridor between the Potrero PP and the SEWPCP, but would not include cooling water intake and outlet structures at the plant site. The proposed cooling system does not change the study area for the plant site.

Except for the alignment between Illinois and 24th streets and one block along César Chavez Street, which is underlain by Map Unit 131, the entire pipeline route is underlain by Map Unit 134. Both of these units are described in the AFC.

8.9.2 ENVIRONMENTAL CONSEQUENCES

During construction of the pipeline, portions of the pipeline corridor may encounter contaminated materials. As discussed above, a SMIP that addresses contaminated soil management would be prepared for approval by the CCSF Department of Public Health prior to obtaining a building permit.

Operation of the Potrero PP with the cooling water system would have the same impacts on agriculture and soils as described in the AFC.

8.9.3 MITIGATION MEASURES

Temporary and permanent erosion control measures described in the AFC would not be required for construction and operation of the proposed cooling tower system.

Soils and bedrock from the foundation excavations and soils excavated from the pipeline route would be handled in accordance with the SMIP.

A comparison of estimated excavation volumes associated with the original project and the amended project indicate that the total volumes and tonnages of soil and rock are approximately equivalent (within about 1 percent).

8.9.4 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Laws, ordinances, regulations, and standards (LORS), involved agencies, and permits required for this work are described in the AFC, and do not change as a result of the proposed cooling tower system.

8.10 TRAFFIC AND TRANSPORTATION

This section assesses the transportation impacts associated with the cooling tower system. The analysis examines the impacts on project vicinity roadways and the intersection levels of service (LOS) expected during construction and operation of the project with the cooling tower system. As in the AFC, the worst-case scenario is quantitatively analyzed for this amendment. Few new permanent employees are added as a result of this project; therefore, the worst-case traffic scenario would occur during the construction period.

Laws, ordinances, regulations, and standards (LORS), involved agencies, and permits required for this work are described in the AFC, and do not change as a result of the proposed cooling tower system.

8.10.1 AFFECTED ENVIRONMENT

8.10.1.1 Existing Roadway Transportation Facilities

The cooling tower system lies near the primary transportation corridors that traverse the southern and eastern sections of San Francisco, providing access between peninsula communities and the employment and cultural centers of the city. Major freeways in proximity to the Potrero PP site include I-80, I-280, and U.S. Route 101.

San Francisco has an extensive street grid system that connects the Potrero PP site to downtown, neighboring communities, and the major freeways mentioned above. The major and secondary arterial roadways within the project vicinity that provide access to/from the Potrero PP include 3rd Street, Bayshore Boulevard, Evans Avenue, and Cesar Chavez Street. The local roadways in the vicinity of the Potrero PP provide street parking as well as direct access to the Potrero PP via Illinois Street and 23rd Street.

The AFC contains detailed descriptions of the project vicinity roadways. Much of the analysis in this amendment uses the AFC information as a base to measure the impacts of the cooling tower system.

8.10.1.2 Other Transportation Facilities

Parking. The streets adjacent to the Potrero PP (Illinois Street, 3rd Street, 22nd Street, and 23rd Street) all provide parking on both sides. The Potrero PP provides onsite parking for approximately 64 vehicles.

Public Transportation. San Francisco is a transit hub served by local and regional bus, rail, and ferry services. The regional service connects downtown San Francisco with the

surrounding suburban areas. The AFC contains detailed descriptions of the project vicinity public transportation facilities. No further evaluation is necessary.

Bicycle/Pedestrian Circulation. There are currently several signed on-street bicycle routes in the project vicinity area but no pedestrian trails. Class III routes are designated with signs only on 3rd Street, Evans Avenue, and Cesar Chavez Street. 3rd Street has sidewalks, although the automobile-oriented nature of the existing land uses does not attract many pedestrians. 22nd and 23rd streets do not have sidewalks. Streets with no sidewalks require pedestrians to use travel or parking lanes.

8.10.1.2.1 Safety

As reported in the AFC, accident rates were found to vary greatly at the project vicinity intersections. However, no significant impacts were discovered that required attention. Therefore, no further reevaluation of project vicinity accident statistics is necessary due to the fact that the cooling tower system would only slightly alter the delivery location of construction materials and power plant equipment during the construction phase. As in the AFC, a nominal permanent traffic increase is anticipated from the project with the cooling tower system. No significant decrease in project vicinity safety is anticipated.

8.10.1.2.2 Goods Movement

Currently, no active freight rail service is provided in the immediate vicinity of the Potrero PP. However, the largely industrial land uses near the Potrero PP generate truck traffic. A designated truck route exists south of the Potrero PP between 3rd Street and the Hunters Point Shipyard area. In general, the number of trucks is greater during the AM peak hour versus the PM peak hour in the project vicinity. Trucks on residential streets approaching 3rd Street account for generally less than 10 percent of the total traffic volume, with greater truck volumes on 3rd Street, Cesar Chavez Street, and Evans Avenue.

8.10.1.3 Planned Transportation Improvements

San Francisco Municipal Railway's (MUNI's) 3rd Street Light Rail Project is currently under construction in the vicinity of the Potrero PP. The project will provide light rail on 3rd Street, reducing the roadway to only two travel lanes in each direction. Near the Potrero PP, left turns will remain on 3rd Street for Evans Avenue, Cargo Way, Cesar Chavez Street, 25th Street (northbound only), 23rd Street, and 20th Street. The reductions in intersection capacity will cause the 3rd Street/Evans Avenue intersection to operate at LOS D during both the AM and PM peak periods when construction is complete.

Other transportation improvement projects currently programmed in this area concern safety improvements. None of these projects would significantly affect roadway capacity in the vicinity of the Potrero PP site.

8.10.2 ENVIRONMENTAL CONSEQUENCES

The operation of the improved Potrero PP site would result in a nominal increase in local traffic, as about 10 permanent workers would be added under either cooling system scenario. Therefore, operations-related traffic is not examined further. Because the cooling tower system would not significantly alter the impacts on the other transportation elements, they will not be analyzed further.

As a part of the AFC, a project area reconnaissance was performed by Korve Engineering in November 1999 and March 2000 to document roadway characteristics, identify physical constraints, and assess general traffic conditions. Korve Engineering conducted a follow-up project area reconnaissance in July 2003 to identify existing traffic volumes at the 3rd Street/Cargo Way intersection for the purpose of evaluating the changes associated with the cooling tower system. No significant traffic circulation pattern changes occurred between March 2000 and July 2003.

8.10.2.1 Thresholds of Significance

To identify appropriate significance criteria for evaluation of potential impacts, the CEQA *Guidelines* were consulted. The CEQA *Guidelines* identify significant impacts if a project results in an increase in traffic that is substantial relative to the amount of existing traffic and the capacity of the surrounding roadway network.

As a part of the AFC and a part this Amendment, an intersection LOS analysis was conducted that quantitatively measured operational performance during the construction phase. The applicable significance threshold for the City of San Francisco is when the project traffic causes LOS to degrade from D or better to LOS E or F, from LOS E to LOS F, or if the project makes a cumulatively considerable contribution to LOS F conditions.

8.10.2.2 Construction Impacts

8.10.2.2.1 Potrero PP and Laydown Area

Trip Generation

During the peak construction phase, the project (Unit 7 plus the cooling tower system) is expected to generate a maximum of approximately 425 daily construction-related vehicle

trips. These consist of 363 private construction worker-related trips to the laydown area (arriving in the AM and departing in the PM), 25 round trip delivery truck trips to the laydown area, 25 truck trips transferring material from the laydown area to the Potrero PP site (25 trips each way), and 12 round trip shuttle bus trips carrying construction workers between the laydown area and the Potrero PP site. For this study, the worst-case scenario assumes all 425 trips arriving and departing during the AM and PM peak periods. In reality, construction workers are expected to park at the Potrero PP site (as in the AFC), delivery vehicles will arrive throughout the day, and most construction activities will occur at off-peak times. These worst-case assumptions allow for a judicious assessment of traffic impacts. Table 8.10-1 shows the trip generation assumptions for the AFC as well as the additional traffic associated with the amendment.

The number of delivery trucks associated with the once-through cooling system in the AFC would remain approximately the same for construction of the cooling tower system. The maximum number of construction personnel needed would increase. The additional 25 maximum round trip delivery vehicle trip movements represent the transportation of construction materials and power plant equipment between the laydown area and the Potrero PP.

Trip Distribution

Based upon traffic counts from CCSF and previous traffic studies conducted within the study area by Korve Engineering, all traffic to the project vicinity has been assumed to split evenly from the north and the south. Additionally, it is assumed that shuttles transporting workers and trucks transferring project-related materials from the laydown area to the Potrero PP site primarily use Cargo Way and 3rd Street. Overall, half of the deliveries and construction workers are assumed to arrive at the laydown area via U.S. Route 101, Evans Avenue, and Jennings Way, while the other half of the deliveries and construction workers are assumed to arrive at the laydown area via I-280, Cesar Chavez Street, 3rd Street, and Cargo Way. All vehicles are assumed to depart using the same routes as their arrival routes.

Intersection Level of Service Analysis

As a part of the AFC, peak hour traffic operations were evaluated within the weekday AM and PM peak periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) for the local roadway network adjacent to the Potrero PP during the construction period. The AFC peak hour analysis examined the worst-case scenario impact of 300 total daily one-way trips associated with construction-related vehicles traveling to the Potrero PP area. The worst-case scenario traffic changes associated with the cooling tower system are the addition of 88 daily one-way construction worker-related vehicle trips, 25 daily one-way delivery truck

trips, and 12 daily one-way shuttle bus trips to the laydown area at Pier 96. If traffic were to occur at the preferred Pier 80 site, trip lengths would be shorter and fewer intersections traversed. The additional 125 daily one-way trips were added to the previous 300 daily one-way trips for the new worst-case scenario.

As a part of the AFC, the traffic impacts on the project vicinity analyzed a broad area. But, because the cooling tower system would add few additional construction worker trips relative to the daily traffic in the vicinity, as well as few additional delivery trips to the project vicinity, a much smaller area was reexamined as part of the LOS analysis for this study. In particular, the amendment would reduce the anticipated project traffic on 3rd Street north of Cesar Chavez Street, which was projected to experience no significant impacts under the previous analysis. Therefore, it is safe to qualitatively state that those locations would experience no significant impact under the amendment since it would result in less traffic north of Cesar Chavez Street than previously assumed. The following five intersections were reexamined:

- 3rd Street/Cesar Chavez Street
- 3rd Street/Cargo Way
- 3rd Street/Evans Avenue
- Cesar Chavez Street/Evans Avenue

Traffic conditions were evaluated using TRAFFIX-97, a transportation planning, design, and operations tool that incorporates the methodology of the Transportation Research Board's 1994 *Highway Capacity Manual*. This program assigns LOS designations based upon average vehicle delay. This methodology complies with the evaluation requirements of CCSF. Intersection conditions were evaluated for the following scenarios:

- Existing conditions
- Existing Plus Project conditions (during construction)

Existing Conditions – Table 8.10-2 shows the results of the existing condition's LOS analysis performed for the AFC and the amendment. Under the existing conditions scenario, the studied intersections operated at LOS C or better for both the AM and PM peak periods in Year 1999. However, LOS E would be expected at the Cesar Chavez Street/Evans Avenue intersection during the PM peak period in Year 2006. Based on the projected construction schedule for the amendment, the year 2006 was used as the base or "existing" condition. All traffic volumes in the study area were increased by half a percent per year to account for background growth in this area. The decrease in LOS at the Cesar Chavez Street/Evans Avenue intersection is attributed to an increase in non-project truck

traffic in the project vicinity. All other studied intersections would operate at LOS D or better for both the AM and PM peak periods in 2006.

Existing Plus Project Conditions – Table 8.10-2 shows the results of the Existing Plus Project Condition's LOS analysis performed for the AFC and the amendment. Under the existing plus project conditions scenario, the studied intersections operated at LOS C or better for both the AM and PM peak periods in Year 1999. Again, LOS E would be expected at the Cesar Chavez Street/Evans Avenue intersection during the PM peak period in 2006. The decrease in LOS at this intersection is attributed to an increase in non-project truck traffic in the project vicinity as well as the vehicle trips associated with the AFC and the amendment. However, if all the trips associated with the Potrero PP were in the peak hour, only 0.4 second of delay would be added to the Cesar Chavez Street/Evans Avenue intersection by the project. This is not considered a significant impact. All other studied intersections operate at LOS D or better for both the AM and PM peak periods in 2006. No mitigation measures are required.

With the cooling tower system as part of construction, approximately 425 daily one-way construction-related vehicle trips would occur in the worst-case scenario in the project vicinity. The analysis suggests that these additional trips would cause less-than-significant increases in vehicle delay at the studied intersections. This would also be the case with the permanent addition of approximately 10 operations employees.

Delivery activities could generate temporary, short-term increases in vehicle trips by construction workers and construction vehicles.

The short-term increases in vehicles from the laydown area to the Potrero PP site are expected to be less than significant. The minimal delivery traffic to/from the Potrero PP site would not cause significant impacts to traffic congestion because this activity would occur primarily at off-peak periods (earlier than the AM and PM peak hours). The LOS worst-case analysis of construction-related traffic accounted for trips associated with project-related deliveries. The LOS analysis involved examining a worst-case scenario in which all construction traffic would occur during peak travel periods. Under this condition, the LOS analysis revealed a less-than-significant impact. Therefore, no mitigation measures are required.

Delivery activities could disrupt existing traffic operations, including transit and bicycle traffic.

The delivery of construction materials and power plant equipment from the laydown area to the Potrero PP site traverses local roadways. The delivery routes would most likely follow along 23rd Street, Illinois Avenue, 3rd Street, Cargo Way, Jennings Street, Evans Avenue,

and Cesar Chavez Street. The bus transit routes and Class III bicycle routes that could be potentially affected by the delivery of construction materials and power plant equipment are on 3rd Street, Evans Avenue, and Cesar Chavez Street. The additional delivery traffic between the Potrero PP site and the laydown area would not affect the overall project vicinity traffic operations and bus/bicycle routes because this activity would occur primarily at off-peak periods (earlier than the AM and PM peak hours). This allows motorists, buses, and bicyclists to avoid potential conflict areas given the under utilization of project vicinity roadways. The LOS worst-case analysis (during peak travel periods) of construction-related traffic accounted for trips associated with project-related deliveries. Under this condition, the LOS analysis revealed a less-than-significant impact. Therefore, no mitigation measures are required.

Construction of the MUNI 3rd Street Light Rail Project is also expected to remain unaffected by the delivery of construction materials and power plant equipment because the light rail construction project is occurring within its own dedicated right-of-way. No significant impacts are anticipated and, therefore, no mitigation measures are required.

Roadway Capacity Analysis

The AFC evaluated the characteristics of the roadways in proximity to the Potrero PP site. The AFC indicated that the project vicinity roadways providing access to the Potrero PP area contain adequate capacity to accommodate the additional vehicle trips expected during the short-term construction phase as well as the operations phase. Impacts during construction and operations are, therefore, not expected to be significant. The AFC identified that local roadways in the project vicinity were operating between 31 percent and 50 percent of their total capacity during the peak period. Hence, there is significant room for additional traffic in this area of San Francisco.

Parking Facilities

Parking impacts were previously reviewed as part of the AFC and no significant impacts were found to occur. In the AFC it was assumed that construction workers for the Unit 7 project would park at the Potrero PP site because adequate space was available. However, the cooling tower system associated with this amendment removes a significant amount of land that was previously set aside for construction-related activities. It is anticipated that most construction worker parking would remain at the Potrero PP site. However, for analysis purposes, a worst-case scenario was examined that assumed offsite construction worker parking was at the laydown area on Pier 96, with the workers shuttled to the site. Under this condition, the LOS analysis revealed a less than significant impact. Therefore, no mitigation measures are required.

8.10.2.2.2 Offsite Facilities

The assessment of construction-related traffic impacts associated with construction of the offsite pump station and associated pipeline was based on several factors including the general construction procedures and equipment that will be used to install the offsite facilities, the level of traffic on key roadways, and appropriate traffic control standards.

Construction activities could generate temporary, short-term increases in vehicle trips by construction workers and vehicles.

The short-term increases in vehicle trips resulting from construction-related traffic for the offsite pump station and pipeline is expected to be less than significant. At the beginning of each day, it is anticipated that the construction workers would travel to the point where construction left off the previous day in a limited number of vehicles by ride sharing from the contractor's trailer site. The vehicular traffic to/from the trailer site would not cause any significant impact on traffic congestion because this activity would occur primarily at off-peak periods (earlier than the AM and PM peak hours). The LOS analysis involved examining a worst-case scenario in which construction traffic associated with the offsite pump station and associated pipeline would occur during peak travel periods. Under this condition, the LOS analysis revealed a less-than-significant impact. Therefore, no mitigation measures are required.

Depending upon how the contractor chooses to advance the pavement restoration, there would be a couple of trucks every few days to/from the work areas to deliver hot mix asphalt and/or concrete. For cost efficiency, the contractor would only have these materials delivered when sufficient quantity could be used to replace a considerable amount of pavement at one time.

Construction activities could disrupt traffic operations, including transit and bicycle traffic.

The pipeline traverses local roadways. Trenching operations along 23rd Street, Tennessee Street, 26th Street, Indiana Street, Davidson Avenue, and Rankin Street would temporarily occupy portions of the street width. Also, the Class III bicycle route along Indiana Street could be potentially affected between 26th Street and Cesar Chavez Street. Since these streets carry a relatively low traffic/bicycle volume, the impact is anticipated to be minor. However, construction of the pipeline would temporarily impede access along the local roadways and the Indiana Street bicycle path, which could be a potentially significant impact depending upon the level of activity experienced.

Placement of the pipeline at the 23rd Street/3rd Street intersection and the Indiana Street/Cesar Chavez Street intersection involves microtunneling below the existing roadway. Microtunneling would help reduce traffic impacts, access issues, and minimize roadway interference at these two intersections resulting in a less than significant impact to area traffic operations. If a pipe conduit has not been previously installed during light-rail construction, microtunneling would occur under 3rd Street. Therefore, no mitigation measures are required.

Construction activities could obstruct access to adjacent land uses and parking.

The pipeline trenching operations would occur along 23rd Street, Tennessee Street, 26th Street, Indiana Street, Davidson Avenue, and Rankin Street, and therefore, cross in front of access driveways to various project vicinity land uses. Construction of the pipeline would temporarily impede access primarily to industrial properties with nearby parking areas, which could be a potentially significant impact depending upon the level of activity experienced at these driveways, sidewalks, and on-street parking areas.

Construction activities could pose a traffic safety hazard to motorists, bicyclists, pedestrians, and construction workers.

Construction of the offsite facilities would present potential traffic safety hazards that would be considered potentially significant. Traffic safety hazards would arise for motorists and bicyclists in the vicinity of work zones where traffic control devices direct traffic in a manner that differs from the usual and expected operation/condition along a particular roadway.

8.10.2.3 Operational Impacts

8.10.2.3.1 Potrero PP and Laydown Area

After completion of the Unit 7 project associated with the AFC and completion of the cooling tower system associated with this AFC amendment, about 10 additional permanent employees are expected to join the existing Potrero PP employee population. No significant impacts are anticipated due to the additional traffic that would be generated by the 10 new employees.

The laydown area would not be used during the operations phase.

8.10.2.3.2 Offsite Facilities

Impacts associated with the operation of the offsite pump station and its associated pipeline are construction-related only. No operations impacts are expected to occur.

8.10.2.3.3 Hazardous Materials Transport

The offsite removal of hazardous materials was discussed in the AFC. The cooling tower system encompasses no significant changes to the assumptions and impacts previously reviewed. No reevaluation is necessary as part of this amendment.

8.10.3 CUMULATIVE IMPACTS

Construction of all the improvements at the Potrero PP including the cooling tower system would add approximately a maximum of 425 daily one-way vehicle trips associated with construction-related activities during the peak travel periods. As noted in the LOS analysis, this is not a significant increase in traffic on roadways that carry volumes of 10,000 to 20,000 vehicles per day or more. The anticipated increase in daily trips is not considered a significant cumulative impact. The permanent addition of about 10 employees would also not cause any significant cumulative traffic impacts.

8.10.4 MITIGATION MEASURES

No new categories of impact associated with traffic were identified for the project with an cooling tower system. Potentially significant impacts are identified in three areas related to pipeline construction: disruption of traffic operations; obstruction of access to land uses and parking; and potential traffic safety hazards. However, existing mitigation measures identified in the AFC for construction of linear features in public rights of way are sufficient to address these impacts. Therefore, no new mitigation measures are required. With these mitigation measures, impacts would be less than significant.

Table 8.10-1 Construction-Related Trip Generation						
Vehicle Type	AFC		Amendment		Total (AFC + Amendment)	
	Average Daily Trips	Maximum Daily Trips	Average Daily Trips	Maximum Daily Trips	Average Daily Trips	Maximum Daily Trips
Construction Personnel	150	275	44	88	194	363
Delivery Trucks	5	10	5	10	10	20
Heavy Delivery Trucks	5	15	5	15	10	30
Shuttle Bus Trips	N/A	N/A	6	12	6	12
Total	160	300	60	125	220	425
Source: Korve Engineering, 1999 and 2003.						
Notes:						
¹ All 363 construction personnel are expected to arrive in the morning and depart in the evening representing one direction of travel during each peak period.						
² The additional truck trips for the amendment are for the transfer of material from the laydown site to the Potrero PP site.						
³ Each shuttle bus trip would carry approximately 30 construction personnel from the laydown site to the Potrero PP site 12 times during the AM peak and 12 times in the opposite direction during the PM peak						

Table 8.10-2 Level of Service/Delay for Existing and Existing Plus Project Conditions					
Intersection	Peak Hour	AFC LOS in Year 1999/ Delay (seconds)		AFC plus Amendment LOS in Year 2006/Delay (seconds)	
		Existing	Existing Plus Project	Existing	Existing Plus Project
3 rd Street/Cesar Chavez Street	AM	B/13.8	B/14.1	B/13.7	B/13.8
	PM	B/12.9	B/13.0	C/15.9	C/16.5
3 rd Street/Cargo Way	AM	N/A	N/A	C/15.9	C/17.9
	PM	N/A	N/A	B/14.9	C/ 17.5
3 rd Street/Evans Avenue	AM	C/15.2	C/ 15.2	D/31.4	D/35.2
	PM	C/15.6	C/15.6	D/27.7	D/27.5
Cesar Chavez Street/Evans Avenue	AM	C/21.3	C/21.4	C/22.4	C/24.0
	PM	C/24.8	C/24.9	E/42.4	E/42.8
Note: Delay is listed in seconds per vehicle. Source: Korve Engineering, 1999 and 2003.					

8.11 VISUAL RESOURCES

This section discusses the potential visual impacts from the construction, operation, and maintenance of the proposed cooling tower system. This study supplements the information collected and analyzed in the visual resources studies undertaken for the Potrero PP Unit 7 Project, provided in the AFC.

The primary change to the project description affecting visual resources has been the addition of a wet/dry cooling tower structure, water supply and discharge pipelines along with the associated pump stations, and a recycled water treatment plant.

8.11.1 AFFECTED ENVIRONMENT

The affected environment includes the visual resources within the vicinity of the proposed project. The landscape setting within the visual sphere of influence (VSOI) for the proposed wet/dry cooling tower has not changed appreciably since the initial Potrero PP Unit 7 Project visual studies were conducted.

8.11.2 VISUAL ASSESSMENT

This visual assessment was conducted to evaluate the potential impacts associated with a wet/dry cooling system for the proposed Potrero PP Unit 7 Project.

The assessment focuses on the degree of change to the landscape character and views as a result of the construction and operation of a wet/dry cooling tower and associated facilities. Potential effects include potential view blockage by structures and other viewing influences, such as visible vapor plumes and night lighting.

Major components of the wet/dry cooling tower include the cooling tower structure (consisting of 14 cells) and fans located on top of the tower (one for each cell). The cooling tower would also require an underground water supply and discharge pipelines with the associated pump stations, and a recycled water treatment plant. The cooling tower would be located adjacent and parallel to the southern boundary of the property, between the existing Potrero Unit 3 and the proposed Unit 7. The water treatment facilities would be located east of the proposed heat recovery steam generators (HRSGs). The cooling tower dimensions used for this analysis were a width of 62 feet, length of 673 feet, and a height of 69 feet. The recycled water treatment plant, located in the interior of the project site, would not be visible from key observation points (KOPs) off site, or would appear as small structures in comparison to adjacent cooling tower and power plant structures. (Refer to Section 2.0 for a detailed description of the cooling system, including site plans.)

Visual simulations have been completed from four perspectives to illustrate the appearance of the wet/dry cooling system. The simulations represent views from an aerial perspective, KOP #1B, KOP #2, and KOP #3, analyzed in the AFC. KOPs #1B, #2 and #3 were selected because they represent potential worst-case impacts to views due to the view angle towards the cooling tower and potential view blockage of the Bay and East Bay hills. In eastward views from KOP #1B, the cooling tower would be aligned east-west in the direction of view, with a minimum amount of view blockage from the structure. Other KOPs at greater viewing distances and/or with less potential for view blockage were evaluated more generally (see below). An aerial simulation of the wet/dry cooling tower is provided in Figure 1-2.

Simulations of the project as proposed are provided to show how the project would appear from KOPs #1B, #2 and #3 (Figures 8.11-1A, 8.11-2A, and 8.11-3A). Existing conditions from these KOPs are shown on Figures 8.11-1B, 8.11-2B, and 8.11-3B.

A visible plume analysis has been conducted using the Seasonal Annual Cooling Tower Impact (SACTI) model. Potential impacts resulting from the plumes are characterized below, based upon interpretation of these data, as well as field observations of atmospheric conditions and visible plumes at other facilities in similar environments.

8.11.3 VISUAL ASSESSMENT RESULTS

The following assessment discusses the analysis of the upland cooling tower system in comparison with the once-through cooling process presented in the AFC. The discussion focuses on the additional visual impacts that could occur with implementation of a wet/dry cooling tower and associated structures, visible vapor plumes, and night-time conditions with visible vapor plumes.

8.11.3.1 Visual Impacts of Cooling Towers and Water Treatment Facilities

The wet/dry cooling tower would not substantially change the industrial character of the landscape that exists in the vicinity of the Potrero PP; however, it would contribute additional industrial facilities to the site. The cooling tower and the water treatment facility would be most noticeable from the three closest KOPs (approximately one-half mile away). These include KOP #1B – Potrero Hill/Watchman Way Neighborhood, KOP #2 – 20th Street/Mississippi Neighborhood, and KOP #3 – 25th Street/Indiana Neighborhood and I-280. Views of the project with a wet/dry cooling tower are provided in Figures 8.11-1A, 8.11-2A, and 8.11-3A).

The visual contrast of the project with a cooling tower system would increase due to the presence of the cooling tower and water treatment plant. Overall, because of their size and location, the water treatment facilities would likely not be visible and are considered not noticeable from the KOPs and other typical viewing locations. They are contained within the

site and visibility is shielded by existing or proposed structures. Views of the project with the wet/dry cooling tower would, however, remain co-dominant from KOPs #1B, #2, and #3.

The primary impact of the wet/dry cooling tower would be additional view blockage at these KOPs of San Francisco Bay and the East Bay Hills from the structure being built between the Bay and hills and viewers. View blockage of the Bay from KOP #1B (see Figure 8.11-1A) would increase slightly, primarily due to the east-west orientation of the cooling towers. View blockage of the Bay would increase slightly from KOP #2 (see Figure 8.11-2A), relative to existing conditions. View blockage of the Bay and East Bay hills from KOP #3 (see Figure 8.11-3A) would be barely discernable, given the height and length of the cooling tower as seen from this angle. For these three KOPs, the impact would be less than significant.

Impacts from the other KOPs previously analyzed in the AFC would also increase with the proposed wet/dry cooling tower and water treatment plant, due to the slight increase in physical structures and view blockage of the Bay. Other KOPs considered in the AFC are shown in Figure 8.11-4. However, visual impacts remain slight due to existing conditions and greater viewing distance. There are no significant increases in view blockage.

Other viewing areas described in the AFC-related analyses are considered to be less likely to be affected, due to viewing conditions. Warm Water Cove Park, located south of the Potrero PP, would be the only other viewing area potentially affected by the wet/dry cooling tower. Views from this area are primarily oriented toward the Bay, away from the cooling tower. Views from the south toward the plant site are partially screened by two existing industrial warehouses. Visual dominance from Warm Water Cove Park would likely increase, but impacts are expected to remain moderate overall. Impacts from other viewing areas previously analyzed may increase, but would be expected to remain moderate to low, primarily due to existing conditions and increased distance.

Visual impacts of the cooling tower structure would be slight to moderate during operations. Impact to visual resources during construction of the proposed project would be the same as previously described for the initial Potrero PP Unit 7 Project.

Because of viewing angle and existing nearby structures, view blockage as a result of the cooling tower system would be less-than-significant from all KOPs.

8.11.3.2 Visual Impacts of Cooling Towers with Visible Vapor Plumes

A wet/dry cooling tower is designed to abate visible plume formation. However, under certain infrequent conditions, vapor plumes could still be visible from wet/dry cooling towers. The visible vapor plumes from wet/dry cooling towers are primarily driven by ambient

meteorological conditions (low temperatures and/or high humidity) and the moisture content of the vapor plumes emanating from cooling tower cells. The visible plumes tend to rise due to the cooling tower fans forcing the moist, warm air upward, and the natural tendency for warmed air to rise. Where plumes occur, they can create visual contrasts, especially in clear weather, due to the whitish color of the vapor plumes and their movement.

Depending on the time of day and meteorological conditions, if the project resulted in visible plumes, they could block a portion of views of the normal backdrop, including the East Bay hills, downtown skyline, Bay Bridge, Hunters Point, Potrero Hill, and Treasure Island from virtually all of the KOPs and viewing areas analyzed in the initial Potrero PP Unit 7 Project and subsequent Data Responses. Other views of the downtown skyline, Bay Bridge, Yerba Buena Island, and Potrero Hill may be blocked in some conditions, as seen from Hunters Point and some locations on the Bay.

The wet/dry cooling tower is designed to abate plumes when the ambient air is above a wet bulb temperature of 29°F and below 90 percent relative humidity. The meteorological conditions in San Francisco fall within these criteria most of the time, and there will not be a visible plume most of the time.

Criteria for establishing the significance of plume visual effects are not well established. However, an April 2003 CEC Staff Report for the Tesla Power Project identified that a 10 percent frequency of plume formation in daylight, no-fog/no-rain conditions would be considered as the threshold to trigger a plume study.¹ A plume frequency of 10 percent or less was considered “infrequent,” and no additional analysis or mitigation would be necessary to address the effects to visual resources. A plume frequency of greater than 10 percent frequency would require further analysis to determine if the visual impacts were significant and if mitigation was appropriate.

An analysis of five years of meteorological data was made to determine the potential frequency of visible vapor plumes from the wet/dry cooling tower. The data analyzed were derived from a meteorological data collection station located at the San Francisco International Airport for the period 1995 through 1999. Each individual hour of meteorological data from this 5-year period was reviewed for temperature, humidity, occurrence of fog or rain, and time of day (day/night).

The results of the meteorological analysis indicate that the visible plumes could occur at various times throughout the year. In daylight, no fog/no rain conditions, plumes would form only 6.2 percent of the time, which is below the level requiring further analysis. In nighttime,

¹ California Energy Commission, Final Staff Assessment, Tesla Power Project Application for Certification (01-AFC-21), April 2003, page 4.11-30

no fog/no rain conditions would occur with a 21.7 percent frequency. Table 8.11-1 illustrates the time periods and frequency of visible plumes.

During nighttime, no-fog/no-rain conditions, plumes are predicted to occur 21.7 percent of the time, which is above the threshold requiring further analysis to determine if the impacts would be significant. The majority of the nighttime plumes would occur between midnight and 5 AM, when the number of people that might be viewing the plumes would be minimized. Also, nighttime plumes are inherently less visible than daytime plumes. These impacts are not expected to be significant, since there would be a relatively low number of viewers present in the early AM (pre-dawn) hours where plumes are most likely to occur.

8.11.3.3 Visual Impacts of Water Supply/Discharge Pipelines And Pump Station

The project would require construction of approximately 1.75 miles of new pipelines and a fiber optic line. A pump station located at the SEWPCP also would be needed. The pipelines would be located underground and would not present any long-term visual impacts. There would be no visual impacts after construction of the pipelines. Visual impacts would primarily occur during construction due the presence of construction equipment, material, and signs. These construction impacts would be noticeable in the primarily industrial setting and would be considered moderate and not significant. This is primarily because the impacts would be short-term and localized.

The pump station at the SEWPCP would be located in an area that is visually dominated by industrial facilities and therefore would be not noticeable and impacts would be low. Construction of the pump station would require the presence of additional equipment and would likely be noticeable on a short-term, localized basis. Therefore, impacts to visual resources from construction of the pump station would be moderate and not significant.

Long-term visual impacts from implementation of the water supply/discharge pipelines and pump station are not expected to be significant because the pipelines are located underground and the pump station would be located within an existing industrial setting.

8.11.4 CONCLUSION

Overall, the additional structural mass and slight view blockage, infrequent vapor plumes and associated view blockage, and possible nighttime effects of the alternative cooling tower facilities are expected to increase visual impacts relative to existing conditions and to a once-through cooling system. The effects of the structural facilities of the wet/dry cooling tower would be most evident from the closer KOPs and result in facility impacts similar to those described in the initial visual studies. Vapor plumes could be more visible from more viewpoints and at varying distances.

When they occur, vapor plumes would likely be considered co-dominant to dominant. They would be visible during the 6.2 percent of daylight, no-fog/no-rain conditions. This low frequency would make them a less-than-significant change in the visual environment. Nighttime effects with plumes are likely to be considered noticeable to co-dominant, but be moderate to low impacts due to the low number of viewers present and an overall decrease in visibility during nighttime hours.

Table 8.11-1 Predicted Frequency of Visible Plumes From Wet/Dry (Plume Abatement) Cooling Tower*			
	Available Hours	Visible Plume Frequency if >90% RH	
		Hours	% Hours
Anytime	43,706	7,788	17.8%
Daylight, no fog, no rain (annual)	19,911	1,237	6.2%
Daylight, no fog, no rain (seasonal **)	8,078	672	8.3%
Nighttime, no fog, no rain	19,202	4,171	21.7%
Notes: * Based upon SFO Met file, 1995 through 1999 ** Seasonal conditions occur anytime between November and April			



KOP #1B
POTRERO HILL NEIGHBORHOOD AT CUL-DE-SAC ON WATCHMAN WAY
SIMULATION SHOWING PROPOSED PROJECT WITH COOLING TOWER



28066634
July 2003



Cooling Tower System Amendment
Potrero Power Plant Unit 7 Project
Mirant Potrero LLC
San Francisco, California

FIGURE 8.11-1A



KOP #1B
POTRERO HILL NEIGHBORHOOD AT CUL-DE-SAC ON WATCHMAN WAY
EXISTING CONDITIONS



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San Francisco, California

FIGURE 8.11-1B



KOP #2
20TH STREET / MISSISSIPPI STREET AND SURROUNDING NEIGHBORHOODS
SIMULATION SHOWING PROPOSED PROJECT WITH COOLING TOWER



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 San Francisco, California

FIGURE 8.11-2A



KOP #2
20TH STREET / MISSISSIPPI STREET AND SURROUNDING NEIGHBORHOODS
EXISTING CONDITIONS



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 San Francisco, California

FIGURE 8.11-2B



KOP #3
25TH STREET / INDIANA STREET, I-280, AND SURROUNDING NEIGHBORHOODS
SIMULATION SHOWING PROPOSED PROJECT WITH COOLING TOWER



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San Francisco, California

FIGURE 8.11-3A



KOP #3
25TH STREET / INDIANA STREET, I-280, AND SURROUNDING NEIGHBORHOODS
EXISTING CONDITIONS

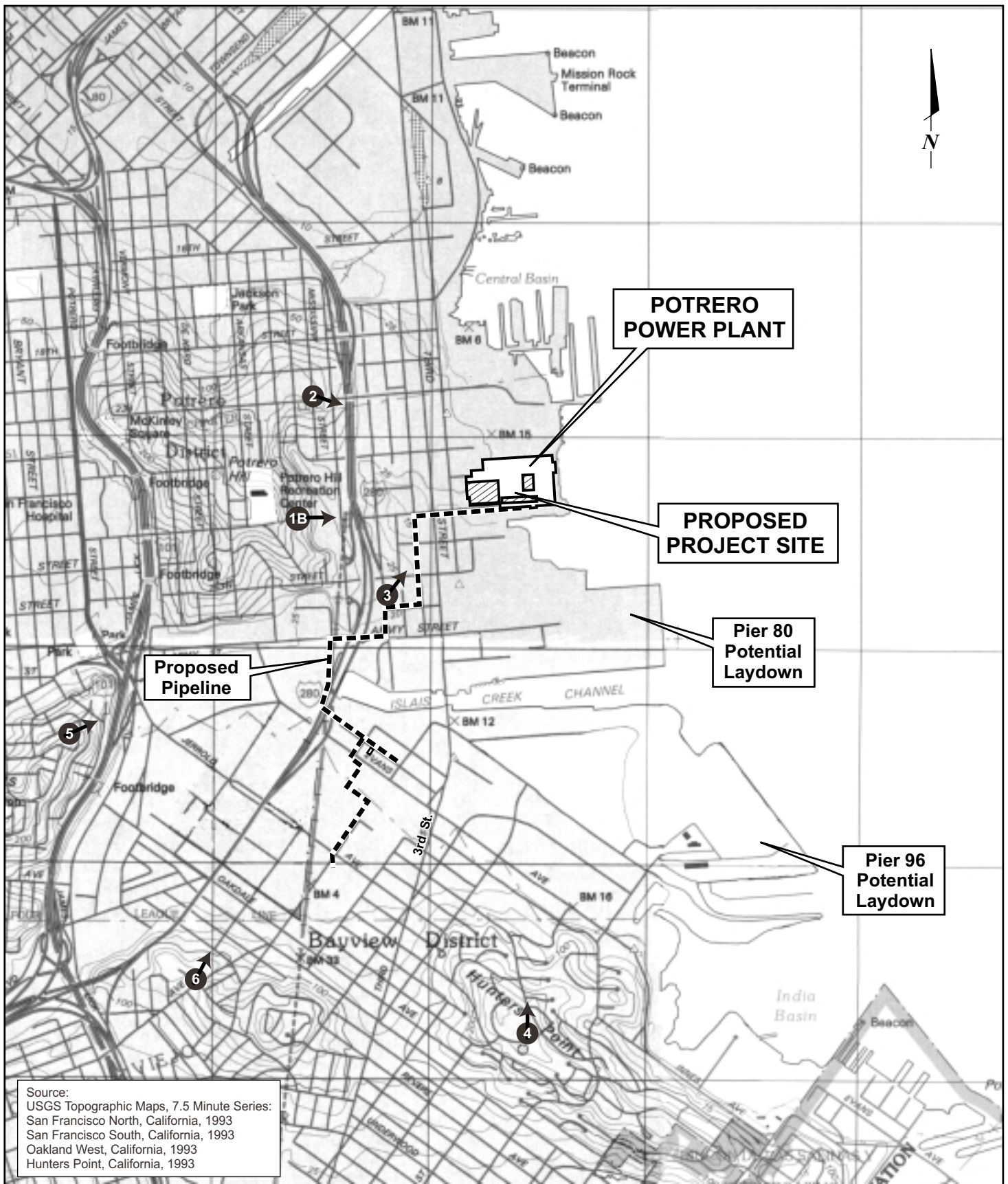


28066634
 July 2003



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FIGURE 8.11-3B



0 2000 4000

Scale in Feet
1:24,000

LEGEND

2 Viewpoint and
Viewing Direction



28066634
July 2003



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San Francisco, California

FIGURE 8.11-4

8.12 HAZARDOUS MATERIALS HANDLING

8.12 HAZARDOUS MATERIALS HANDLING

This section discusses the hazardous materials to be used in conjunction with construction and operation of the proposed wet/dry cooling tower system for the Potrero PP Unit 7 Project. Storage facilities and handling equipment for hazardous materials have been designed so that in the unlikely event of an accidental release of a hazardous material, the potential impacts would be below designated thresholds of significance.

To minimize the risks and off-site consequences from hazardous materials, a federal program was established in 1990 as described in Section 112 (r) of the Clean Air Act. The California Office of Emergency Services established the California Accidental Release Prevention (Cal-ARP) Program to prevent accidental releases of regulated substances. The Cal-ARP Program specifies the regulated substances, oversees the federal requirements, and determines the requirements for the preparation of a Risk Management Plan (RMP) and off-site accidental release consequence analysis.

No substances would be used in the construction or operation of the proposed wet/dry cooling system that are regulated by the Cal-ARP program. The only hazardous substance currently proposed for the Potrero PP Unit 7 Project that requires an RMP is aqueous ammonia, which is used in the Selective Catalytic Reduction (SCR) system to reduce emissions of nitrogen oxides. An RMP would be submitted to the San Francisco Hazardous Materials Unified Program Agency prior to the arrival of aqueous ammonia at the Potrero PP and will be kept on file at the Potrero PP facility. None of the aqueous ammonia storage, handling, or processing systems would be altered in any way by the construction or operation of the proposed wet/dry cooling system addition. Therefore, the RMP would still only be required to examine the consequences of storing aqueous ammonia on site.

Beneficial design features of the proposed wet/dry cooling system project include containment basins around the chemical storage tanks that would reduce potential impacts below a level of significance.

8.12.1 AFFECTED ENVIRONMENT

The local setting at the Potrero PP would not change from that described in the AFC.

The plant site is in Seismic Risk Zone 4; hence, construction and design of the wet/dry cooling system would conform to the 1997 Uniform Building Code, the 1998 California Building Code, and the City and County of San Francisco Building Code.

The existing hazardous materials at the Potrero PP would not change from those described in the AFC.

8.12.2 ENVIRONMENTAL CONSEQUENCES

The addition of the proposed wet/dry cooling tower system for the Potrero PP Unit 7 Project is not expected to cause significant impacts to the environment. The continued safe transport, use and disposal of hazardous materials by Mirant would avoid or minimize significant impacts from the potential release of hazardous materials. An accidental release would only be precipitated by either a mishandling of the hazardous materials or a catastrophic event. Although the probability of such events occurring is extremely low, passive design features have been included in the project design to reduce potential impacts in the event of a release to a level of insignificance. Hence, additional mitigation measures beyond those proposed are not required (see Section 8.12.5, Mitigation Measures). The mitigation measures proposed in the AFC would ensure that potential impacts from accidental releases of hazardous material would be less than significant (i.e., below the level where no human health or environmental impacts are noted).

8.12.2.1 Construction Phase

Hazardous materials used during the construction phase of the cooling system would be limited to flushing and cleaning fluids and solvents, paint waste, antifreeze and pesticides. The construction contractor would be considered the generator of hazardous construction waste and would be responsible for proper handling of hazardous wastes in accordance with all applicable federal, state, and local laws and regulations, including licensing, personnel training, accumulation limits and time, reporting and record keeping. To the extent applicable, the same responsibilities would be incurred by the demolition contractor. Any hazardous wastes generated either during construction or demolition would be collected in hazardous waste accumulation containers near the point of generation and moved daily to a 90-day hazardous waste storage area located on the site. The accumulated waste would be delivered subsequently to an authorized waste management facility.

Material Safety Data Sheets for each onsite chemical would be kept on site and construction employees would be aware of their location and content.

Preparation of the existing storage tanks would include cleaning. All cleaning waste water would be disposed of in an appropriate manner.

The most probable accidents might occur from small-scale spills during cleaning or use of other materials in the storage areas. No additional measures beyond those described in this section are needed to reduce potential impacts below a level of significance.

8.12.2.2 Operational Phase

A small number of hazardous materials would be stored and used on site during the operation of the wet/dry cooling system at the Potrero PP. Table 8.12-4 lists the additional hazardous materials that would be used or stored on site as a result of the proposed project. Information provided in this table for each material includes the maximum quantity stored onsite, Chemical Abstract Service (CAS) number, usage, location, nature of the hazard, and state/federal threshold quantities.

All water treatment chemicals would be stored within suitable containment structures. The immediate area around these chemicals would be appropriately labeled. The storage of such chemicals on site would be minimized. In the unlikely event that any of these chemicals must be disposed of, such disposal would be conducted in compliance with all local, state, and federal disposal and handling regulations.

Solvents may be used for parts cleaning and other maintenance activities. The use of solvents on site would be minimized. All solvents would be stored in labeled areas in appropriate containers. Spent solvents would be recycled, if practical, or would be disposed of in an appropriate manner.

Wastewater resulting from periodic cleaning of components may contain elevated concentrations of heavy metals. All such cleaning wastewater would be disposed of in an appropriate manner.

Curbs, berms, and concrete pits would be used where accidental releases of hazardous and acutely hazardous materials could occur. All containment areas would be constructed in accordance with the applicable laws, ordinances, regulations, and standards (LORS). Containment areas would be drained to appropriate collection sumps or neutralization tanks for recycling or off site disposal. Double-walled piping would be used when feasible to minimize the potential of a release from ruptured piping. Traffic barriers would protect piping and tanks from potential traffic hazards.

To minimize impacts from accidental releases, workers would be trained in the safe handling of hazardous materials, use of response equipment, procedures for mitigation of a release, and coordination with local emergency response organizations. More importantly, to avoid or minimize impacts from the accidental releases of hazardous materials, nonhazardous or less hazardous materials would be used where possible and engineering controls would be implemented.

The most probable accidents involving hazardous materials may include small-scale spills of waste oil or other chemicals from product or satellite storage areas. To avoid potential impacts all spills would be cleaned up immediately.

8.12.3 FIRE AND EXPLOSION RISK

No additional flammable substances would be used in conjunction with the proposed wet/dry cooling system than those described in the Potrero PP Unit 7 Project AFC.

8.12.4 CUMULATIVE IMPACTS

No acutely hazardous materials would be used during the construction or operation of the proposed wet/dry cooling tower system at the Potrero PP. Impacts from accidental releases of other hazardous materials would be small in scale and would not contribute significantly in combination with a hazardous material release from another location within the surrounding area.

8.12.5 MITIGATION MEASURES

A number of passive mitigation features have been included in the proposed wet/dry cooling system project design, such as containment basins around the chemical storage tanks that are sized to hold the volume of the largest tank within each basin, plus an allowance for rainfall and freeboard. Curbs, berms, and traffic barriers would also be used where accidental releases of hazardous materials could occur. These passive design features would reduce potential off site impacts in the event of any accidental release to a level of insignificance; therefore, additional mitigation measures would not be required.

8.12.6 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No LORS related to hazardous materials handling would apply to the proposed wet/dry cooling system other than those described in the AFC. The proposed project would be in compliance with applicable LORS during both construction and operation of the facility. Emergency response procedures would be coordinated between facility personnel and local emergency planning and response organizations.

8.12.7 REFERENCES

California Office of Emergency Services, 1998. *California Code of Regulations, Title 19. Public Safety, California Accidental Release Prevention Program*, November 1998.

U.S. EPA (U.S. Environmental Protection Agency), 1996. *Federal Register, Part III
Accidental Release Prevention Requirements: Risk Management Programs Under
the Clean Air Act Section 112(r)(7)*, June 20, 1996, 40 CFR Part 68, FRL-5516-5.

Table 8.12-1
Proposed Hazardous Materials to Be Used in the Wet/Dry Cooling System at the Potrero Power Plant

Material	CAS Number	Location Used	# of Location on Figure 2-1	Hazardous Characteristics	Maximum Quantity Onsite	Regulatory Thresholds (lbs)			
						Cal-ARP	Federal RQ	Federal TPQ	Federal TQ
Sodium Hypochlorite (15%)	7681-52-9	Recycled Water Treatment	16	Corrosive	500 gal tote	-	100	-	-
Isothiazolin (1.15%) (Methyl-isothiazolin)	26530-20-1	Cooling Tower	1	Skin and eye irritant	500 gal tote	-	-	-	-
Sulfuric Acid ¹ (93%)	7664-93-9	Cooling Tower	1	Toxic	10,000 gal Storage tank	1,000	1,000	1,000	-
Sodium Hydroxide (50%)	1310-73-2	Recycled Water Treatment	15	Toxic, Corrosive	2 – 4,000 gal storage tanks	-	1,000	-	-
Polyacrylate	None	Cooling Tower	1	None	500 gal tote	-	-	-	-
Aluminum Sulfate	10043-01-3	Recycled Water Treatment	13	Health	2 – 4,000 gals storage tanks	-	5,000	-	-
Chemical Cleaning Agents	Various	Water Treatment Building	-	Various	55 gal drums, bags, totes	NA	NA	NA	NA
Various Laboratory Reagents	Various	Water Treatment Building	-	Various	small bottles for laboratory use	NA	NA	NA	NA

1 Sulfuric acid fails the evaluation pursuant to Section 25532(g)(2) of the HSC but remains listed as a Regulated Substance only under the following conditions:

- If concentrated with greater than 100 pounds of sulfur trioxide or the acid meets the definition of oleum.
- If in a container with flammable hydrocarbons (flash point < 73 °F).

NA = not applicable

- = no standards

8.13 WASTE MANAGEMENT

The AFC addressed potential impacts related to waste management that might result from Unit 7 construction. This amendment addresses only those additional impacts that might result from the new components of the cooling tower system.

Cumulative impacts, mitigation measures, laws, ordinances, regulations, and standards (LORS), involved agencies, and permits required for this work are described in the AFC, and do not change as a result of the proposed cooling tower system.

8.13.1 AFFECTED ENVIRONMENT

The Potrero PP site has been characterized in the AFC. The pipeline route is proposed to run from the Potrero PP west along 23rd Street to Tennessee Street, south to 26th Street, west to Indiana Street, south to César Chavez Street, west under I-280 to a railroad right-of-way, south to Davidson Avenue, and east to the SEWPCP.

8.13.2 ENVIRONMENTAL CONSEQUENCES

The upland cooling tower system would not change the Unit 7 project construction impacts described in the AFC. The upland cooling tower system would not change the project construction impacts described in the AFC. Waste materials from construction would be managed in accordance with the management strategies outlined in the AFC, including disposal, source minimization, reuse, and recycling.

During operations, the cooling tower system would generate waste at the recycled water treatment plant. This would be sludge material from the treatment process that would be pumped back to the SEWPCP via a 4-inch pipeline. This material is a normal byproduct of the treatment process and requires no special handling. As described in detail in Section 8.14, Water Resources, the blowdown from the cooling tower would include chemicals added to prevent fouling and scaling. These are non-hazardous materials at the concentrations present in the blowdown returned to the SEWPCP for treatment.

Lubricants would be used on mechanical equipment associated with pumps, fans, motors, and similar moving parts. The management of these materials is described in the AFC. No extraordinary amounts of waste would be generated by the cooling tower system, therefore no additional management practices or mitigation strategies are required beyond those provided in the AFC.

8.13.3 CUMULATIVE IMPACTS

No new cumulative impacts are expected to waste management as a result of the cooling tower system.

8.13.4 MITIGATION MEASURES

No mitigation measures are required. However, the best management practices identified for waste management in the AFC will apply to the cooling tower system.

8.13.5 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The LORS applicable to the Unit 7 Project will apply to the cooling tower system with respect to waste management. No additional LORS are identified.

8.14 WATER RESOURCES

The cooling tower system includes a wet/dry cooling tower, with a water treatment plant to provide tertiary treated water, and pipelines to and from the SEWPCP. The upland cooling tower system is an alternative to once-through cooling using Bay water.

8.14.1 AFFECTED ENVIRONMENT

This section describes the potentially affected environment relative to water resource features in the area of the proposed project site.

The descriptions provided in the AFC for groundwater environment, quality, beneficial uses, and surface water do not change as a result of the cooling tower system.

The upland cooling tower system does not include once-through cooling using seawater from San Francisco Bay. Therefore, the discussions provided in the AFC of currents, salinity, water temperature, Bay water quality, and Bay water beneficial uses in San Francisco Bay for a new once-through cooling system would not be relevant if the Applicant elected to implement this alternative.

8.14.1.1.1 Thermal Effects Studies

The discussion of the previous thermal effects study would not be relevant as the wet/dry cooling tower would not require discharge to the Bay. Because a new diffuser system would not be constructed, the reduction in existing thermal impacts to the shoreline and surface waters from the existing Unit 3 once-through cooling system would not occur.

8.14.2 ENVIRONMENTAL CONSEQUENCES

The cooling tower system would include a wet/dry cooling tower with a recycled water treatment plant and pipelines to and from the SEWPCP, and would eliminate once-through cooling using Bay water.

The environmental significance criteria for the project are unchanged.

8.14.2.1 Groundwater

There would be no changes to the potential onshore construction or operation impacts on groundwater or the mitigation measures.

The proposed project would have no significant impacts on groundwater in the project area. With the implementation of BMPs during construction, operation, and maintenance activities, there would be no impacts to groundwater quality or quantity.

8.14.2.2 Surface Water

Wet/dry cooling would not require construction of new intake and discharge structures. Because the structures would not be constructed, the improvements to existing thermal impacts and related improvement to beneficial use of the Bay, that would result from replacing the existing Unit 3 cooling system, would not be realized. The evaluation and mitigation provided in the AFC for onshore construction on surface water is unchanged.

With the wet/dry cooling tower system, use of recycled City wastewater during operations would replace use of Bay water for cooling purposes. Potential operations and maintenance impacts on Bay surface water would no longer apply.

Water Use

The wet/dry cooling tower system would require a supply of treated wastewater for cooling tower makeup water. San Francisco Bay water would not be used for once-through cooling. The discussions of other water uses at the project site are unchanged.

A supply of 4.7 million gallons per day (mgd) of secondary wastewater would be provided via an 18-inch pipeline from the SEWPCP to an on-site recycled water treatment plant. Treated secondary effluent from SEWPCP would be treated to CCR Title 22 “disinfected tertiary recycle water” standards. The tertiary water treatment plant would use membrane bioreactor technology to coagulate phosphorous, oxidize ammonia and BOD, and filter suspended solids. Processes would include aluminum sulfate (alum) injection to bind phosphorus, sodium hydroxide addition to maintain pH, a UV light disinfection system, and sodium hypochlorite addition to chlorinate the treated water. These are standard processes, some of which are in use at the SEWPCP. The tertiary water would be pumped to onsite storage tanks for use as cooling tower makeup water.

The tertiary treatment would result in the water quality characteristics shown in Table 8.14-1. As shown in the table, tertiary treatment reduces the concentrations of total suspended solids, BOD, oil & grease, phosphorus, and ammonia.

Table 8.2-3 summarizes the projected water requirements for the proposed Unit 7, including the cooling tower system.

Wastewater

The wastewater streams are changed in that tertiary treatment sludge and cooling tower blowdown are added to the list of wastewater streams. Circulating cooling water is removed. Once-through cooling would not be used and hence circulating cooling water would not be discharged to San Francisco Bay under a new NPDES permit. The sludge (suspended solids) from the tertiary treatment plant would be returned to the SEWPCP via a 4-inch return line. The blowdown stream from the wet/dry cooling tower would be routed back to the SEWPCP via an 8-inch pipeline.

Additives to the tertiary treated water would be used in the wet/dry cooling tower to control water quality. The additives and resulting concentrations in the wastewater stream would be as follows:

- Sulfuric acid would be added to control and maintain pH and alkalinity. The maximum alkalinity would be 200 mg/L but may be lower depending on the concentration of calcium in the water. The blowdown alkalinity would be less than 200 mg/L.
- An organic phosphonate would be added to inhibit calcium carbonate scale. Two compounds would be used: amino-methylene phosphonic acid or 1-hydroxyl-ethylidene-1,1-diphosphonic acid. The blowdown concentration would be 10 to 15 mg/L as phosphate.
- Sodium hypochlorite is the main anti-microbial agent that will be added to control biofouling. The concentration of sodium hypochlorite in blowdown would be less than 0.5 mg/L. A second anti-microbial agent, isothiazolone, would be used infrequently to control chlorine resistant microorganisms. The concentration of isothiazolone in blowdown would be less than 1.5 mg/L. Manufacturer's data indicate isothiazolone has a half-life of 1.5 hours.
- A polysilicate would be used to protect metal from corrosion in doses from 8 to 20 mg/L. The typical concentration of polysilicate in blowdown would be 4 to 5 ppm.
- A synthetic polyacrylate will be used as a dispersant to control scale deposits at a dose of 4 to 5 mg/L. The typical concentration of polyacrylate in blowdown would be 2 to 5 ppm.

The above additives are short-lived and the concentrations in the blowdown stream would have a *de minimis* effect on the cooling water chemistry. None of these are hazardous waste and do not require any special handling.

Discharges to the City of San Francisco Sewer System

The sludge and blowdown discharge described would be returned to the SEWPCP. The suspended solids from the tertiary treatment plant would be returned at a rate of 25,000 gpd. The blowdown discharge would return between 0.96 mgd and 1.47 mgd of the 4.7 mgd supplied for the project.

The wet/dry cooling system would circulate cooling water through five concentration cycles. Makeup water would be added continually to the cooling water (design rate of 3,239 gpm) and blowdown would be continually removed (at a design rate of 669 gpm) to maintain water chemistry. The difference between these two rates is loss by evaporative cooling. As a consequence, the blowdown return flow would contain approximately 5 times the concentration of the constituents in the wastewater remaining after tertiary treatment. The blowdown wastewater characteristics are shown in Table 8.14-1. The constituents in the blowdown stream would be those in the secondary wastewater supplied by the SEWPCP plus the additives listed above.

The SEWPCP has the capacity to treat up to 260 mgd during wetter months. The facility treats an average volume of 84 mgd during dry months. The average blowdown return flow of approximately 0.96 to 1.47 mgd would not have a significant impact on the capacity of the SEWPCP or the water quality of the flow to the plant. During winter storm events when the SEWPCP is operating at capacity, the cooling tower system would account for approximately 0.4 percent of the wastewater entering the treatment facility.

The proposed project would not have any effect on surface water quality over existing conditions. Because the new diffuser would not be constructed, the net positive effect on beneficial uses of Bay waters, as a result of replacing the existing Unit 3 cooling system, would not occur. The proposed Unit 7 would use recycled wastewater from the SEWPCP for cooling tower makeup water. This reuse of wastewater from treatment works is consistent with the objectives of California Water Code.

8.14.3 MITIGATION MEASURES

There are no changes to the mitigation measures previously presented in the AFC to protect groundwater and surface waters.

8.14.4 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

LORS identified in the AFC remain applicable to the cooling tower system, except those applicable to once-through cooling, which would no longer apply. The wet/dry cooling tower would not require use of once-through cooling water from the Bay, and therefore, the regulations applying to use of San Francisco Bay water no longer apply. The cooling tower makeup water would be supplied as treated City water and blowdown would be returned to the City.

Regulations governing Bay water pollution including the State Water Resources Control Board (SWRCB) and RWQCB are not applicable for wet/dry cooling. Dredging would not occur as part of wet/dry cooling and therefore U.S. Army Corps of Engineers and associated state and local dredging permits would not be required. Secondary effluent from SEWPCP would be treated to CCR Title 22 "disinfected tertiary recycle water" standards. State regulations governing the quality of tertiary water used in cooling applications would apply, as would a City permit for industrial discharges to the City sewer system.

California Water Code (CWC) § 13550 et seq.

Administering Agency: SWRCB; RWQCB

Compliance: Requires use of reclaimed water where available and appropriate. The State Water Resources Control Board also adopted Resolution 75-58, which encourages the use of wastewater for power plant cooling and established the following order of preference for cooling purposes:

1. Wastewater discharged to the ocean
2. Ocean water
3. Brackish water or irrigation return flow
4. Inland wastewater with low total dissolved solids (TDS)
5. Other inland water

Wastewater will be used for cooling purposes for the proposed project.

8.14.5 INVOLVED AGENCIES AND AGENCY CONTACTS

A new NPDES permit will not be required and dredging for a new intake will not occur. Therefore, the agencies issuing NPDES and dredging permits (USACE, RWQCB, BCDC, DF&G, F&WS, NMFS) will no longer be involved.

Table 8.14-1 Cooling Tower Water Quality Concentrations			
Parameter	Unit	Tertiary Cooling Tower Makeup Water (Recycled)	Estimated Cooling Tower Water Blowdown (After 5 Concentration Cycles)
Calcium	mg/L	29	145
Magnesium	mg/L	42	210
Sodium	mg/L	361	1,805
Potassium	mg/L	23	115
Bicarbonate	mg/L	225	225
Carbonate	mg/L		
Hydroxide	mg/L		
Chloride	mg/L	581	2,905
Sulfate	mg/L	120	1,308
Nitrates	mg/L		
Silica	mg/L	12.7	65
Total Suspended Solids	mg/L	1	5-15
pH	pH units	7.5	8-8.5
Oil & Grease	mg/L	<1.0	5
Fluoride	mg/L	1.2	6
TDS	mg/L	1,390	7,000
Phosphorous	mg/L	1-3	15-20
Ammonia Nitrogen	mg/L	4-5	25
BOD	mg/L	5-15	50
Chromium ¹	µg/L	1.3	6.5
Copper ¹	µg/L	14.5	72.5
Mercury ¹	µg/L	0.0187	0.0935
Nickel ¹	µg/L	3.9	19.5
Lead ¹	µg/L	2.5	12.5
Selenium ¹	µg/L	0.5	2.5
Zinc ¹	µg/L	62.4	312
Note: ¹ Metal concentrations obtained from SEWPCP NPDES permitting information. Metals will not be added in the power plant cooling system. Evaporation of water in the cooling system will increase the concentration of metals.			

8.15 GEOLOGIC HAZARDS AND RESOURCES

8.15 GEOLOGIC HAZARDS AND RESOURCES

This section summarizes the changes in the environmental setting for and potential environmental impacts on geologic hazards and resources that could result from the construction of the proposed cooling tower system. The AFC addressed potential impacts to geologic hazards and resources that might result from Unit 7 construction and operation. This amendment addresses only those additional impacts that might result from the proposed new components of the cooling water system.

8.15.1 AFFECTED ENVIRONMENT

The study area for the local geology of the amended project does not include the once-through cooling system intake and discharge structures, but does include a pipeline corridor between the Potrero PP and the SEWPCP.

8.15.2 ENVIRONMENTAL CONSEQUENCES

The impacts of the proposed cooling system would be the same as those described in the AFC for the Unit 7 project.

8.15.3 CUMULATIVE IMPACTS

No cumulative impacts are expected to the geologic environment.

8.15.4 MITIGATION MEASURES

Applicable mitigation measures identified in the AFC apply to the cooling tower system. No new mitigation measures are required.

8.15.5 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Laws, ordinances, regulations, and standards (LORS), involved agencies, and permits required for this work are the same as described in the AFC, except that the California Division of Mines and Geology has changed its name to the California Geological Survey.

8.16 PALEONTOLOGICAL RESOURCES

This section summarizes the changes in the environmental setting for and potential environmental impacts on paleontological resources (fossils) that could result from construction of the proposed cooling tower system. The AFC for Potrero PP Unit 7 and the previous paleontological resources impact assessment addressed potential impacts to paleontological resources that might result from Unit 7 construction. This amendment addresses only those additional impacts that might result from the proposed new components of the cooling water system.

Laws, ordinances, regulations, and standards (LORS) applicable to paleontological resources are summarized in the AFC.

8.16.1 AFFECTED ENVIRONMENT

The site proposed for construction of the upland cooling tower system is in the southeastern portion of the City and County of San Francisco in the western portion of the Coast Ranges Physiographic Province. The general geology of the San Francisco area is described in the AFC.

8.16.2 RESOURCE INVENTORY METHODS

To assess the potential impacts of construction of the cooling tower system on paleontological resources, Dr. Lanny Fisk searched published and available unpublished geologic and paleontologic literature, and compiled, synthesized, and evaluated stratigraphic and paleontologic inventories.

8.16.3 RESOURCE INVENTORY RESULTS

8.16.3.1 Site Geology

The components of the proposed cooling tower system, including the recycled-water supply and wastewater return pipelines and the recycled-water pump station, are located primarily on artificial fill overlying either late Pleistocene to Holocene alluvium or rocks of the Franciscan Complex.

8.16.3.2 Paleontological Resource Inventory

No fossil sites have previously been recorded within the footprint of the Potrero PP site or recycled-water treatment plant, nor within the linear corridor of the cooling water and wastewater pipelines. However, numerous significant and scientifically important fossils

have been previously reported from late Pleistocene to Holocene alluvium or rocks of the Franciscan Complex in the San Francisco area. Several fossil sites were documented as occurring near the proposed location of the cooling tower system facilities.

8.16.4 ENVIRONMENTAL CONSEQUENCES

The potential impacts on paleontological resources from construction and operation of the cooling tower system are summarized in this section.

8.16.4.1 Paleontological Resource Significance Criteria

Stratigraphic (geologic) units are assigned a high, low, or undetermined potential to impact fossil resources during construction. All stratigraphic units in which fossils have previously been found have high sensitivity. Both the Quaternary sediments and rocks of the Franciscan Complex, which underlie the cooling water system, have produced significant fossils in the past and therefore have high sensitivity.

8.16.4.2 Paleontological Resource Impact Assessment

Using the methods and criteria of the Society of Vertebrate Paleontology (SVP 1995), the significance was assessed of the potential adverse impacts of earth moving on the paleontological resources of each stratigraphic unit likely to be disturbed by construction of the proposed cooling tower system.

During construction of the proposed cooling tower system, excavations deeper than artificial fill would disturb Quaternary sediments and rocks of the Franciscan Complex, both of which have produced significant fossils in the past. Project-related earth-moving activities could potentially have adverse impacts on significant paleontological resources in these sediments and rocks. However, although each of the stratigraphic units that could be impacted by construction could be fossiliferous and any fossils discovered could be significant and scientifically important, the overall probability that earth moving related to construction of the cooling water system would impact fossils in these stratigraphic units is considered to be low.

8.16.5 MITIGATION

To reduce potential adverse impacts to significant paleontological resources resulting from construction of the cooling tower system, the mitigation measures proposed in the CEC Final Staff Assessment (CEC 2003) would be applied. These mitigation measures are consistent with SVP standard guidelines for mitigating adverse construction-related impacts

on paleontological resources (SVP 1995, 1996) and would result in less-than-significant impacts.

8.16.6 REFERENCES

CEC (California Energy Commission), 2000, Paleontological resources: p. 35 in Energy facility licensing process – developer's guide of practices & procedures, California Energy Commission, Sacramento, CA, 70 p.

CEC (California Energy Commission), 2003, Final staff assessment, Potrero Power Plant Unit 7 Project (00 AFC 4): California Energy Commission, Sacramento, CA, variously paged.

SVP (Society of Vertebrate Paleontology), 1995, Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources – standard guidelines: Society of Vertebrate Paleontology News Bulletin, vol. 163, p. 22-27.

SVP (Society of Vertebrate Paleontology), 1996, Conditions of receivership for paleontologic salvage collections: Society of Vertebrate Paleontology News Bulletin, vol. 1166, p. 31-32.

9.0 ALTERNATIVES

The cooling tower system is an alternative to once-through cooling. Wet/dry cooling was identified in the AFC as an alternative cooling method.

10.0 ENGINEERING

The engineering section of the AFC is unchanged, with the exception of the identification of additional LORS applicable to the project with the cooling tower system. These are identified in Table 10-1.

Table 10-1 Additional Applicable Laws, Ordinances, Regulations, and Standards				
Jurisdiction	LORS	Applicability	Administering Agency or Professional Association	Permit Required
Industry	Standards	Meet Design Criteria	NAAM – National Association of Architectural Metal Manufacturers	None
Industry	Standards	Meet Design Criteria	TEMA – Tubular Exchanger Manufacturers Association	None
Industry	Standards	Meet Design Criteria	American Bearing Manufacturers Association	None

**APPENDIX A. AIR
QUALITY DATA**

APPENDIX A

AIR QUALITY DATA

APPENDIX A AIR QUALITY DATA

- A1 OPERATIONAL EMISSIONS
- A2 COOLING TOWER AND TURBINES ISC MODEL INPUT/OUTPUT
(EXCERPTS)
- A3 COOLING TOWER AND TURBINES SCREEN3 FUMIGATION
MODEL OUTPUT
- A4 COOLING TOWER AND TURBINES SHORTZ MODEL OUTPUT
(EXCERPTS)

A1 OPERATIONAL EMISSIONS

Potrero Power Plant Unit 7 Project
Turbine/HRSG Stack Emission Calculations - Rev. 1

Ambient Temperature		35°F			55°F			80°F		
CTG Load Level	100%	75%	50%	100%	75%	50%	100%	75%	50%	100%
Over pressure	No	No	No	No	No	No	No	No	No	Yes
Power Augmentation	No	No	No	No	No	No	No	No	No	Yes
Duct Burner Heat Input (MMBTU/hr)										391.1 ^(a)
Stack Outlet Temperature (°F)	194	186	177	192	184	175	191	182	174	178
Average Emission Rates from each Gas Turbine (lbs/hr/turbine) - Normal Operation										
(Reference: GE Turbine/Site Specific Information)										
Fuel Flow (MMBTU/hr)	1858	1502	1200	1793	1455	1167	1745	1420	1139	2059.5
Oxygen	521873.93	424757.01	357310.32	497689.43	410862.14	348178.86	482923.2	407802.23	344825.33	408696.46
CO ₂	220308.62	176785.75	139937.33	212642.73	171014.8	135719.25	207100.51	166835.56	132522.16	258123.89
H ₂ O	183061.64	146725.44	116360.93	192960.1	155426.98	124160.74	204618.06	156940.6	125444.27	364883.68
N ₂	2727457.18	2206708.6	1815624.57	2612518.03	2135777.56	1767434.81	2538099.63	2106329.34	1740758.87	2539067
Ar	46298.62	37023.19	30766.85	45189.72	36918.52	30506.33	43258.59	36092.28	29449.37	43547.857
NO _x	16.99	13.61	10.78	16.4	13.19	10.48	15.96	12.87	10.22	19.96
CO	24.83	19.89	15.75	23.96	19.27	15.31	23.32	18.8	14.92	29.16
Hydrocarbon as CH ₄	15	12	10	14	11	9	14	11	9	44.8704
VOC	4.73	3.79	3	4.56	3.67	2.92	4.44	3.58	2.84	5.55
SO ₂	2.58	2.08	1.66	2.49	2.02	1.62	2.42	1.97	1.58	2.86
PM	11	11	11	11	11	11	11	11	13	13
NH ₃ (@10 ppm slip)	25.12	20.12	15.94	24.24	19.5	15.48	23.6	19.02	15.1	29.5
% of HC as VOC	31.5	31.6	30.0	32.6	33.4	32.4	31.7	32.5	31.6	12.4
Total Inerts	3698999.99	2991999.99	2460000	3561000.01	2910000	2405999.99	3475999.99	2874000.01	2373000	3614318.887
Total	3699100.237	2992082.483	2460068.134	3561096.657	2910079.648	2406065.799	3476094.73	2874078.249	2373064.66	3614463.784
Total Inerts (lbmol/hr/turbine)	130052.316	105179.529	86423.74337	125539.5479	102561.7071	84748.26671	122893.7299	101382.814	83662.97884	130679.1927
Total Inerts/ 1atm;outlet T) (cfm)	1034634.972	826518.5144	669666.3884	995677.8815	803450.8753	654620.9518	973197.7819	791747.971	645219.6853	1014176.255
sulfur content in gas:	0.5	gr total S / 100 scf								
(a) Maximum Capability of Duct Burner										

Potrero Power Plant Unit 7 Project
Turbine/HRSG Stack Emission Calculations - Rev. 1

Startup / Shutdown Emissions from Turbine (1CT)											
Cold Startup			Warm Startup			Hot Startup			Shutdown		
256 minutes	Max 1-hr.	Total	130 min.	Max 1-hr.	Total	90 min.	Max 1-hr.	Total	23 min.	Max 1-hr.	Total
	lb/hr	lb/256 min		lb/hr	lb/130 min		lb/hr	lb/90 min		lb/hr	lb/23 min
NO _x	170.19	452.07	NO _x	162.49	249.31	NO _x	163.79	188.90	NO _x	71.63	58.80
CO	547.94	990.26	CO	446.46	572.26	CO	268.01	290.78	CO	91.12	72.86
UHC		334.70	UHC		153.84	UHC		80.38	UHC		17.39
VOC		111.79	VOC		51.38	VOC		26.85	VOC		5.81
SO ₂	1.62	6.91	SO ₂	1.62	3.51	SO ₂	1.62	2.43	SO ₂	1.62	0.62
PM	11.00	46.93	PM	11.00	23.83	PM	11.00	16.50	PM	11.00	4.22
Assumptions:											
Startup and Shutdown Emissions for CO, NO _x , and UHC integrated from data provided by Southern Energy California. "GT1+GT2" data is conservatively used as emission rate data from ONE turbine.											
VOC Emissions are assumed to be 33.4% of UHC emissions. This fraction is the maximum fraction seen in the operating conditions.											
SO ₂ emissions assume complete conversion of all sulfur to SO ₂ .											
SO ₂ and PM ₁₀ startup and shutdown cases for annual emission rates are based on the average temperature, low load operating emission rate (60°F/50%).											
SO ₂ and PM ₁₀ emission rates for 1, 3, or 24-hour averages area based upon operating conditions at given load and temperature.											
Average Annual Emissions											
Duct Burner Emission Rates are based on the maximum duct burner capability scenario (80°F; 100% load; overpressure; power augmentation; duct burner duty = 391.1 MMBTU/hr).											
Average Operation Emission Rates are based on the average operation scenario (55°F; 100% load; no overpressure; no power augmentation)											
			Emissions								
			Turbine			for Both					
			Emissions			Turbines					
			lb/yr/CT			ton/yr/2CT					
Total Hours of Operation	7446										
Total Number of Cold Starts	14.0										
Cold Start Duration (hr)	4.27										
Total Number of Warm Starts	0										
Warm Start Duration (hr)	2.17										
Total Number of Hot Starts	5.5										
Hot Start Duration (hr)	1.50										
Total Number of Shutdowns	19.5										
Shutdown Duration (hr)	0.38										
Duct Burner Operation (hr)	2200										
Average Operation (hr)	5170.54										

Potrero Power Plant Unit 7 Project
Turbine/HRSG Stack Emission Calculations - Rev. 1

Worst-Case 1-Hour Emissions per Turbine												
Worst-Case 1-Hour Emissions for NO ₂ and CO are equal to Cold Startup emission rates. Worst-Case 1-Hour emission rates for SO ₂ are equal to operating emission rates.												
Ambient Temperature		35°F			55°F			80°F				
CTG Load Level		100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	100%
(lb/hr/turbine)												
NO ₂		170.19	170.19	170.19	170.19	170.19	170.19	170.19	170.19	170.19	170.19	170.19
CO		547.94	547.94	547.94	547.94	547.94	547.94	547.94	547.94	547.94	547.94	547.94
SO ₂		2.58	2.08	1.66	2.49	2.02	1.62	2.42	1.97	1.58	2.86	3.09
(g/sec/turbine)												
NO ₂		21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44	21.44
CO		69.04	69.04	69.04	69.04	69.04	69.04	69.04	69.04	69.04	69.04	69.04
SO ₂		0.32	0.26	0.21	0.31	0.25	0.20	0.30	0.25	0.20	0.36	0.39
Worst-Case 3 Hour Emission Rate per Turbine												
Only SO ₂ is considered for an average 3-hour Ambient Air Quality Standard. Emission rates are equal to the operating emission rates.												
Ambient Temperature		35°F			55°F			80°F				
CTG Load Level		100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	100%
SO ₂ (lb/hr/CT)		2.58	2.08	1.66	2.49	2.02	1.62	2.42	1.97	1.58	2.86	3.09
SO ₂ (g/sec/CT)		0.32	0.26	0.21	0.31	0.25	0.20	0.30	0.25	0.20	0.36	0.39
Worst-Case 8-Hour Emission Rates												
Only CO is considered for an average 8-hour Ambient Air Quality Standard.												
Worst-case 8-Hour Scenario includes one Cold Startup and one Shutdown. Remainder of 8 hours is at normal operating emission rates.												
Total Hours of Operation		8										
Cold Startup Duration (hours)		4.27										
Shutdown (hours)		0.38										
Hours of Baseline Operation (hr)		3.35										
Ambient Temperature		35°F			55°F			80°F				
CTG Load Level		100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	100%
CO (lb/hr/CT)		143.29	141.22	139.49	142.92	140.96	139.30	142.66	140.76	139.14	145.10	145.29
CO (g/s/CT)		18.05	17.79	17.57	18.01	17.76	17.55	17.97	17.74	17.53	18.28	18.31
Worst-Case 24 Hour Emission Rate												
Only SO ₂ and PM ₁₀ are considered for an average 24-hour Ambient Air Quality Standard.												
Startup and Shutdown emission rates for SO ₂ and PM ₁₀ are considered to be equal to operating emission rates.												
Therefore, including Startup and Shutdown scenarios does not increase the 24-hour average emission rate.												
Normal operating load is conservatively assumed for the entirety of the 24 hours.												
Ambient Temperature		35°F			55°F			80°F				
CTG Load Level		100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	100%
SO ₂ (lb/hr/CT)		2.58	2.08	1.66	2.49	2.02	1.62	2.42	1.97	1.58	2.86	3.09
SO ₂ (g/s/CT)		0.32	0.26	0.21	0.31	0.25	0.20	0.30	0.25	0.20	0.36	0.39
PM (lb/hr/CT)		11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	13.00	13.00
PM (g/s/CT)		1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.64	1.64

Cooling Tower Emission Rates Potrero Unit 7 Project

PM10 Emissions from Cooling Tower			
Water Rate	140000	gpm	
Drift Rate	0.0005	%	
Number of Cells	14		
Maximum TDS+TSS	7015	ppmw	
	Emission Rate		
	lb/hr/cell	g/s/cell	tons/yr
PM ₁₀ ^a	0.176	2.2E-02	9.16
PM ₁₀ ^b	0.149	1.9E-02	9.16

a: Maximum Emission Rate.

b: Assumes annualized usage of 7446 hrs/year.

**A2 COOLING TOWER AND TURBINES ISC MODEL
INPUT/OUTPUT (EXCERPTS)**

*** ISCST3 - VERSION 02035 ***
 *** Potrero Units 7 and 8 Includes Cooling Tower ***
 *** Model Executed on 07/14/03 at 13:49:28 ***
 Input File - E:\Southern\Potrero\CT Amend\CT-PM24.DTA

Output File - E:\Southern\Potrero\CT Amend\CT-PM24.LST

Met File - E:\Southern\Potrero\CT Amend\pot92.isc

Number of sources - 16
 Number of source groups - 3
 Number of receptors - 2267

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
NSTACK	0	0.13860E+01	554314.0	4178806.0	7.6	54.86	351.89	14.87	5.11	YES	
SSTACK	0	0.13860E+01	554314.0	4178762.0	7.6	54.86	351.89	14.87	5.11	YES	
CT1	0	0.22000E-01	554330.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT2	0	0.22000E-01	554344.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT3	0	0.22000E-01	554358.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT4	0	0.22000E-01	554372.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT5	0	0.22000E-01	554386.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT6	0	0.22000E-01	554400.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT7	0	0.22000E-01	554414.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT8	0	0.22000E-01	554428.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT9	0	0.22000E-01	554442.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT10	0	0.22000E-01	554456.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT11	0	0.22000E-01	554470.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT12	0	0.22000E-01	554484.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT13	0	0.22000E-01	554498.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT14	0	0.22000E-01	554512.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs											
ALL	NSTACK	, SSTACK	, CT1	, CT2	, CT3	, CT4	, CT5	, CT6	, CT7	, CT8	, CT9	, CT10
	CT11	, CT12	, CT13	, CT14								
TURB	NSTACK	, SSTACK										
CT	CT1	, CT2	, CT3	, CT4	, CT5	, CT6	, CT7	, CT8	, CT9	, CT10	, CT11	, CT12
	CT13	, CT14										

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM24 IN MICROGRAMS/M**3											
GROUP ID	AVERAGE CONC			DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID	
ALL	HIGH	1ST HIGH VALUE IS	4.96274	ON 92072024:	AT (	554658.00,	4178742.00,	0.00,	0.00)	DC	NA
TURB	HIGH	1ST HIGH VALUE IS	2.90527	ON 92072024:	AT (	554683.00,	4178792.00,	0.00,	0.00)	DC	NA
CT	HIGH	1ST HIGH VALUE IS	3.30406	ON 92072024:	AT (	554599.00,	4178720.00,	0.60,	0.00)	DC	NA

*** ISCST3 - VERSION 02035 ***
 *** Potrero Units 7 and 8 Includes Cooling Tower ***
 *** Model Executed on 07/14/03 at 13:56:00 ***
 Input File - E:\Southern\Potrero\CT Amend\CT-PMANN.DTA

Output File - E:\Southern\Potrero\CT Amend\CT-PMANN.LST

Met File - E:\Southern\Potrero\CT Amend\pot92.isc

Number of sources - 16
 Number of source groups - 3
 Number of receptors - 2267

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
NSTACK	0	0.12411E+01	554314.0	4178806.0	7.6	54.86	351.89	14.87	5.11	YES	
SSTACK	0	0.12411E+01	554314.0	4178762.0	7.6	54.86	351.89	14.87	5.11	YES	
CT1	0	0.19000E-01	554330.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT2	0	0.19000E-01	554344.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT3	0	0.19000E-01	554358.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT4	0	0.19000E-01	554372.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT5	0	0.19000E-01	554386.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT6	0	0.19000E-01	554400.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT7	0	0.19000E-01	554414.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT8	0	0.19000E-01	554428.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT9	0	0.19000E-01	554442.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT10	0	0.19000E-01	554456.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT11	0	0.19000E-01	554470.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT12	0	0.19000E-01	554484.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT13	0	0.19000E-01	554498.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT14	0	0.19000E-01	554512.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
ALL	NSTACK , SSTACK , CT1 , CT2 , CT3 , CT4 , CT5 , CT6 , CT7 , CT8 , CT9 , CT10 , CT11 , CT12 , CT13 , CT14 ,
TURB	NSTACK , SSTACK ,
CT	CT1 , CT2 , CT3 , CT4 , CT5 , CT6 , CT7 , CT8 , CT9 , CT10 , CT11 , CT12 , CT13 , CT14 ,

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS) RESULTS ***

** CONC OF PMANN IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.83762 AT (554633.00, 4178792.00,	0.00, 0.00)	DC NA
	2ND HIGHEST VALUE IS	0.83233 AT (554608.00, 4178792.00,	0.40, 0.00)	DC NA
	3RD HIGHEST VALUE IS	0.81094 AT (554658.00, 4178792.00,	0.00, 0.00)	DC NA
	4TH HIGHEST VALUE IS	0.81003 AT (554633.00, 4178767.00,	0.00, 0.00)	DC NA
	5TH HIGHEST VALUE IS	0.80088 AT (554658.00, 4178817.00,	0.00, 0.00)	DC NA
	6TH HIGHEST VALUE IS	0.80083 AT (554599.00, 4178795.00,	0.60, 0.00)	DC NA
	7TH HIGHEST VALUE IS	0.78776 AT (554683.00, 4178817.00,	0.00, 0.00)	DC NA
	8TH HIGHEST VALUE IS	0.78485 AT (554599.00, 4178770.00,	0.60, 0.00)	DC NA
	9TH HIGHEST VALUE IS	0.78120 AT (554633.00, 4178817.00,	0.00, 0.00)	DC NA
	10TH HIGHEST VALUE IS	0.76844 AT (554683.00, 4178842.00,	0.00, 0.00)	DC NA
TURB	1ST HIGHEST VALUE IS	0.49119 AT (554808.00, 4179017.00,	0.00, 0.00)	DC NA
	2ND HIGHEST VALUE IS	0.48682 AT (554683.00, 4178942.00,	0.00, 0.00)	DC NA
	3RD HIGHEST VALUE IS	0.48134 AT (554683.00, 4178967.00,	0.00, 0.00)	DC NA
	4TH HIGHEST VALUE IS	0.47981 AT (554708.00, 4178917.00,	0.00, 0.00)	DC NA

	5TH HIGHEST VALUE IS	0.47788 AT (	554683.00,	4178917.00,	0.00,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.47228 AT (	554658.00,	4178942.00,	0.00,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.46905 AT (	554658.00,	4178917.00,	0.00,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.45935 AT (	554658.00,	4178967.00,	0.00,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.45847 AT (	554908.00,	4179017.00,	0.00,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.45822 AT (	554683.00,	4178892.00,	0.00,	0.00)	DC	NA
CT	1ST HIGHEST VALUE IS	0.51070 AT (	554608.00,	4178792.00,	0.40,	0.00)	DC	NA
	2ND HIGHEST VALUE IS	0.49891 AT (	554633.00,	4178792.00,	0.00,	0.00)	DC	NA
	3RD HIGHEST VALUE IS	0.49411 AT (	554633.00,	4178767.00,	0.00,	0.00)	DC	NA
	4TH HIGHEST VALUE IS	0.49286 AT (	554599.00,	4178770.00,	0.60,	0.00)	DC	NA
	5TH HIGHEST VALUE IS	0.48337 AT (	554599.00,	4178795.00,	0.60,	0.00)	DC	NA
	6TH HIGHEST VALUE IS	0.46873 AT (	554608.00,	4178767.00,	0.40,	0.00)	DC	NA
	7TH HIGHEST VALUE IS	0.45727 AT (	554658.00,	4178792.00,	0.00,	0.00)	DC	NA
	8TH HIGHEST VALUE IS	0.42486 AT (	554658.00,	4178817.00,	0.00,	0.00)	DC	NA
	9TH HIGHEST VALUE IS	0.41916 AT (	554658.00,	4178767.00,	0.00,	0.00)	DC	NA
	10TH HIGHEST VALUE IS	0.41831 AT (554633.00,	4178817.00,	0.00,	0.00)	DC	NA

**A3 COOLING TOWER AND TURBINES SCREEN3
FUMIGATION MODEL OUTPUT**

Potrero Power Plant Cooling Tower Alternative

Fumigation Analysis

Pollutant	TIBL	Distance (m)	Rural 1-hr Fumigation (µg/m ³)		Flat terrain (µg/m ³)		Flat Terrain Urban/Rural		Urban Fumigation (µg/m ³)		Flat Terrain Turbines		Cooling Towers		Total 24-hr Impact (µg/m ³)
			Rural	1-hr	Rural	Urban	Urban	Urban/Rural	1-hr	24-hr	1-hr	24-hr	1-hr	24-hr	
Turbines	Inversion	16,849	1.270	3.790	2.722	2.143	8.123	3.249	--	--	--	--	0.2815	0.113	3.362
	2	24,936	1.226	2.610	1.951	1.591	4.153	0.346	--	--	--	--	0.1888	0.076	0.422
	3	8,496	1.240	7.200	4.464	3.600	25.920	2.160	--	--	--	--	0.5668	0.227	2.387
	4	4,023	1.757	13.650	5.875	3.344	45.642	3.804	--	--	--	--	1.193	0.477	4.281
	5	2,268	2.375	20.630	4.841	2.038	42.050	3.504	--	--	--	--	1.962	0.785	4.289
	6	1,401	3.299	27.080	2.666	0.808	21.884	1.824	--	--	--	--	2.571	1.028	2.852
Cooling Towers	Inversion	4,612	1.003	2.121	1.485	1.481	3.140	1.256	3.719	1.488	--	--	--	--	2.744
	2	7,094	0.993	1.368	0.986	0.993	1.358	0.113	2.915	1.166	--	--	--	--	1.279
	3	1,922	1.097	4.799	2.867	2.613	12.542	1.045	3.567	1.427	--	--	--	--	2.472
	4	794	2.835	9.105	2.523	0.890	8.103	0.675	0.629	0.252	--	--	--	--	0.927
	5	394	6.001	12.250	2.274	0.379	4.642	0.387	3.09E-02	0.012	--	--	--	--	0.399
	6	205	7.389	13.870	4.834	0.654	9.074	0.756	1.93E-03	0.001	--	--	--	--	0.757

Shoreline Fumigation impacts converted from 1-hr SCREEN3 results to 24-hour results by applying a persistence factor of 0.083. Other 1-hr SCREEN3 results multiplied by 0.4 to convert to 24-hr concentrations.

07/14/03
13:38:14

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Turbine Impact during Cooling Tower Fumigation

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 3.27600
STACK HEIGHT (M) = 56.3880
STK INSIDE DIAM (M) = 5.1100
STK EXIT VELOCITY (M/S) = 23.3973
STK GAS EXIT TEMP (K) = 354.1100
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = URBAN
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 258.476 M**4/S**3; MOM. FLUX = 2956.942 M**4/S**2.

*** STABILITY CLASS 6 ONLY ***
*** ANEMOMETER HEIGHT WIND SPEED OF 2.00 M/S ONLY ***

*** SCREEN DISCRETE DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
4612.	3.719	6	2.0	3.4	10000.0	161.28	302.27	134.50	NO
7094.	2.915	6	2.0	3.4	10000.0	161.28	399.47	169.01	NO
1922.	3.567	6	2.0	3.4	10000.0	161.28	161.77	83.59	NO
794.	0.6290	6	2.0	3.4	10000.0	161.28	81.78	52.34	NO
394.	0.3091E-01	6	2.0	3.4	10000.0	161.28	50.21	39.02	NO
205.	0.1930E-02	6	2.0	3.4	10000.0	161.28	36.99	33.22	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	3.719	4612.	0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

07/03/03
10:38:03

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Cooling Tower Impacts during Turbine Fumigation

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.308000
STACK HEIGHT (M) = 20.9100
STK INSIDE DIAM (M) = 10.2600
STK EXIT VELOCITY (M/S) = 9.1400
STK GAS EXIT TEMP (K) = 298.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = URBAN
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 39.576 M**4/S**3; MOM. FLUX = 2161.616 M**4/S**2.

*** STABILITY CLASS 6 ONLY ***
*** ANEMOMETER HEIGHT WIND SPEED OF 1.50 M/S ONLY ***

*** SCREEN DISCRETE DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
16849.	0.2815	6	1.5	1.9	10000.0	89.12	666.49	263.69	NO
24936.	0.1888	6	1.5	1.9	10000.0	89.12	828.23	322.49	NO
8496.	0.5668	6	1.5	1.9	10000.0	89.12	446.04	184.37	NO
4023.	1.193	6	1.5	1.9	10000.0	89.12	274.65	122.90	NO
2268.	1.962	6	1.5	1.9	10000.0	89.12	181.70	88.65	NO
1401.	2.571	6	1.5	1.9	10000.0	89.12	124.90	66.56	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	2.571	1401.	0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

07/03/03
10:26:07

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Cooling Tower Fumigation

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.308000
STACK HEIGHT (M) = 20.9100
STK INSIDE DIAM (M) = 10.2600
STK EXIT VELOCITY (M/S)= 9.1400
STK GAS EXIT TEMP (K) = 298.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 39.576 M**4/S**3; MOM. FLUX = 2161.616 M**4/S**2.

*** FULL METEOROLOGY ***

*** INVERSION BREAK-UP FUMIGATION CALC. ***

CONC (UG/M**3) = 2.121
DIST TO MAX (M) = 4612.02

*** SHORELINE FUMIGATION CALC. ***

TIBL FACTOR = 2
CONC (UG/M**3) = 1.368
DIST TO MAX (M) = 7094.42
DIST TO SHORE (M)= 190.00

*** SHORELINE FUMIGATION CALC. ***

TIBL FACTOR = 3
CONC (UG/M**3) = 4.799
DIST TO MAX (M) = 1921.78
DIST TO SHORE (M)= 190.00

*** SHORELINE FUMIGATION CALC. ***

TIBL FACTOR = 4
CONC (UG/M**3) = 9.105
DIST TO MAX (M) = 794.02
DIST TO SHORE (M)= 190.00

*** SHORELINE FUMIGATION CALC. ***

TIBL FACTOR = 5
CONC (UG/M**3) = 12.25
DIST TO MAX (M) = 394.00
DIST TO SHORE (M)= 190.00

*** SHORELINE FUMIGATION CALC. ***

TIBL FACTOR = 6
CONC (UG/M**3) = 13.87
DIST TO MAX (M) = 204.64
DIST TO SHORE (M)= 190.00

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
INV BREAKUP FUMI	2.121	4612.	--
SHORELINE FUMI 6 *	13.87	205.	--
* TIBL FACTOR (BETWEEN 2 AND 6)			

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

07/03/03
10:53:35

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Cooling Tower Urban

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.308000
STACK HEIGHT (M) = 20.9100
STK INSIDE DIAM (M) = 10.2600
STK EXIT VELOCITY (M/S) = 9.1400
STK GAS EXIT TEMP (K) = 298.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = URBAN
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BOUY. FLUX = 39.576 M**4/S**3; MOM. FLUX = 2161.616 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN DISCRETE DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
4612.	1.485	6	1.0	1.2	10000.0	98.99	301.61	133.00	NO
7094.	0.9862	6	1.0	1.2	10000.0	98.99	398.96	167.83	NO
1922.	2.867	6	1.0	1.2	10000.0	98.99	160.52	81.16	NO
794.	2.523	6	1.0	1.2	10000.0	98.99	79.29	48.36	NO
394.	2.274	4	8.0	9.6	2560.0	44.77	59.23	52.88	NO
205.	4.834	4	15.0	18.0	4800.0	19.27	31.68	28.02	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	4.834	205.	0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

07/03/03
10:49:29

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Cooling Tower Rural

SIMPLE TERRAIN INPUTS:

SOURCE TYPE = POINT
EMISSION RATE (G/S) = 0.308000
STACK HEIGHT (M) = 20.9100
STK INSIDE DIAM (M) = 10.2600
STK EXIT VELOCITY (M/S) = 9.1400
STK GAS EXIT TEMP (K) = 298.0000
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = 0.0000
URBAN/RURAL OPTION = RURAL
BUILDING HEIGHT (M) = 0.0000
MIN HORIZ BLDG DIM (M) = 0.0000
MAX HORIZ BLDG DIM (M) = 0.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 39.576 M**4/S**3; MOM. FLUX = 2161.616 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN DISCRETE DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
4612.	1.003	5	1.0	1.3	10000.0	113.85	205.26	59.71	NO
7094.	0.9934	5	1.0	1.3	10000.0	113.85	300.67	71.59	NO
1922.	1.097	4	8.0	8.9	2560.0	48.95	123.88	50.06	NO
794.	2.835	4	15.0	16.8	4800.0	21.50	55.49	27.24	NO
394.	6.001	4	20.0	22.3	6400.0	15.13	29.29	15.54	NO
205.	7.389	4	20.0	22.3	6400.0	15.13	16.11	9.02	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	7.389	205.	0.

** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

**A4 COOLING TOWER AND TURBINES SHORTZ MODEL
OUTPUT (EXCERPTS)**

POSTZ - A POST PROCESSOR FOR THE SHORTZ MODEL

POSTZ RUN TITLE: PM10 Annual and 24-hour
SHORTZ RUN TITLE: SOUTHERN ENERGY PORTRERO PM10 24-Hour with Cooling Tower

ISW(1) RESTRICT TIME LIMITS (1=YES,0=NO) 0
ISW(2) LIMIT RECEPTORS TO ANALYZE (1=YES,0=NO) 0
ISW(3) LIMIT SOURCES TO ANALYZE (1=YES,0=NO) 0
ISW(4) SPECIFY BACKGROUND CONCENTRATIONS (0=NO,1=UNIFORM,2=BY RECEPTOR) 0
ISW(5) SCALE CONCENTRATIONS FOR SPECIFIC SOURCES (1=YES,0=NO) 0

1-HOUR AVERAGE ANALYSIS:

ISW(6) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(7) TOP 50 TABLE PREPARED (1=YES,0=NO) 0
ISW(8) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

3-HOUR AVERAGE ANALYSIS:

ISW(9) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(10) TOP 50 TABLE PREPARED (1=YES,0=NO) 0
ISW(11) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

8-HOUR AVERAGE ANALYSIS:

ISW(12) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(13) TOP-50 TABLE PREPARED (1=YES,0=NO) 0
ISW(14) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

24-HOUR AVERAGE ANALYSIS:

ISW(15) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(16) TOP-50 TABLE PREPARED (1=YES,0=NO) 1
ISW(17) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

ANNUAL AVERAGE ANALYSIS:

ISW(18) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(19) TOP-50 TABLE PREPARED (1=YES,0=NO) 1
ISW(20) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

USER-SPECIFIED AVERAGING TIME ANALYSIS

ISW(21) HIGH-5 TABLE PREPARED (1=YES,0=NO) 0
ISW(22) TOP-50 TABLE PREPARED (1=YES,0=NO) 0
ISW(23) EXCEEDANCE TABLE PREPARED (1=YES,0=NO) 0

ISW(24) BLOCK OR RUNNING AVERAGES (0=BLOCK,1=RUNNING) 0
ISW(25) CALMS POLICY (1=YES,0=NO) 0

JULIAN DAY FOR START OF ANALYSIS 1
YEAR FOR START OF ANALYSIS 1992
JULIAN DAY FOR END OF ANALYSIS 1
YEAR FOR END OF ANALYSIS 1993

TOP 50 TABLE FOR 24 HOUR AVERAGE CONCENTRATIONS

RANK	VALUE	RECEPTOR COORDINATES		ELEVATION	DAY	ENDING TIME
		X	Y			
1	3.12	553050.	4178675.	96.	351	24
2	3.11	553075.	4178675.	94.	351	24
3	3.10	553100.	4178675.	93.	351	24
4	3.09	553025.	4178675.	96.	351	24
5	3.09	553125.	4178675.	92.	351	24
6	3.06	553150.	4178675.	91.	351	24
7	3.06	553050.	4178700.	95.	351	24
8	3.06	553025.	4178700.	96.	351	24
9	3.02	553075.	4178700.	93.	351	24
10	3.01	553175.	4178675.	90.	351	24
11	2.99	553100.	4178650.	94.	351	24
12	2.99	553075.	4178650.	95.	351	24
13	2.98	553050.	4178650.	96.	351	24
14	2.98	553100.	4178700.	91.	351	24
15	2.96	553125.	4178700.	90.	351	24
16	2.96	553200.	4178675.	88.	351	24
17	2.96	553125.	4178650.	93.	351	24
18	2.96	553150.	4178700.	89.	351	24
19	2.95	553175.	4178700.	89.	351	24
20	2.92	553000.	4178700.	94.	351	24
21	2.92	553200.	4178700.	88.	351	24
22	2.91	553000.	4178675.	93.	351	24

23	2.91	553025.	4178650.	95.	351	24
24	2.91	553150.	4178650.	92.	351	24
25	2.90	553225.	4178675.	87.	351	24
26	2.89	553225.	4178700.	87.	351	24
27	2.85	553175.	4178650.	90.	351	24
28	2.83	553250.	4178675.	86.	351	24
29	2.80	553200.	4178650.	89.	351	24
30	2.79	553250.	4178700.	85.	351	24
31	2.77	553050.	4178725.	93.	351	24
32	2.76	552975.	4178700.	91.	351	24
33	2.75	553025.	4178725.	94.	351	24
34	2.74	553225.	4178650.	87.	351	24
35	2.73	553000.	4178725.	94.	351	24
36	2.72	553075.	4178725.	91.	351	24
37	2.70	553100.	4178625.	95.	351	24
38	2.69	553000.	4178650.	89.	351	24
39	2.68	553075.	4178625.	94.	351	24
40	2.68	552975.	4178675.	87.	351	24
41	2.67	553125.	4178625.	94.	351	24
42	2.66	553250.	4178650.	86.	351	24
43	2.65	553050.	4178625.	94.	351	24
44	2.63	552975.	4178725.	93.	351	24
45	2.61	553150.	4178625.	92.	351	24
46	2.61	553100.	4178725.	88.	351	24
47	2.60	553200.	4178725.	85.	351	24
48	2.59	553225.	4178725.	85.	351	24
49	2.59	553175.	4178725.	86.	351	24
50	2.59	552950.	4178700.	87.	351	24

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POSTZ - PAGE NO. 3

TOP 50 TABLE FOR 8784 HOUR AVERAGE CONCENTRATIONS

RANK	VALUE	RECEPTOR COORDINATES		ELEVATION	DAY	ENDING TIME
		X	Y			
1	0.05	553025.	4178700.	96.	366	24
2	0.05	553050.	4178700.	95.	366	24
3	0.05	553050.	4178675.	96.	366	24
4	0.05	553025.	4178675.	96.	366	24
5	0.05	553075.	4178675.	94.	366	24
6	0.05	553000.	4178725.	94.	366	24
7	0.05	553050.	4178650.	96.	366	24
8	0.05	552975.	4178750.	95.	366	24
9	0.05	553025.	4178725.	94.	366	24
10	0.05	553075.	4178650.	95.	366	24
11	0.05	552975.	4178775.	95.	366	24
12	0.05	553000.	4178750.	94.	366	24
13	0.05	553075.	4178700.	93.	366	24
14	0.05	553050.	4178725.	93.	366	24
15	0.05	553100.	4178650.	94.	366	24
16	0.05	553100.	4178675.	93.	366	24
17	0.05	553000.	4178700.	94.	366	24
18	0.05	552950.	4178775.	95.	366	24
19	0.05	553125.	4178675.	92.	366	24
20	0.05	552975.	4178800.	95.	366	24
21	0.05	553025.	4178650.	95.	366	24
22	0.05	553125.	4178650.	93.	366	24
23	0.05	552975.	4178725.	93.	366	24
24	0.05	553100.	4178625.	95.	366	24
25	0.05	553000.	4178775.	94.	366	24
26	0.05	552950.	4178800.	95.	366	24
27	0.05	552950.	4178750.	93.	366	24
28	0.05	553025.	4178750.	92.	366	24
29	0.05	553100.	4178700.	91.	366	24
30	0.05	553125.	4178625.	94.	366	24
31	0.05	553150.	4178675.	91.	366	24
32	0.05	553075.	4178625.	94.	366	24
33	0.05	552975.	4178825.	95.	366	24
34	0.05	553000.	4178675.	93.	366	24
35	0.05	553075.	4178725.	91.	366	24
36	0.05	553150.	4178650.	92.	366	24
37	0.05	553000.	4178800.	94.	366	24
38	0.05	552950.	4178825.	95.	366	24
39	0.05	553125.	4178700.	90.	366	24
40	0.05	553050.	4178625.	94.	366	24
41	0.05	553025.	4178775.	92.	366	24
42	0.05	553050.	4178750.	91.	366	24
43	0.05	552975.	4178700.	91.	366	24
44	0.05	553150.	4178700.	89.	366	24
45	0.05	553150.	4178625.	92.	366	24
46	0.05	553175.	4178675.	90.	366	24
47	0.05	553100.	4178600.	93.	366	24
48	0.05	553125.	4178600.	93.	366	24

49	0.05	553000.	4178825.	94.	366	24
50	0.05	553175.	4178700.	89.	366	24

APPENDIX B

LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4169 002	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4169 003	State Property	105 Harrison Street San Francisco, California 94105
4170 001 4170 002 4170 003 4170 004 4170 006 4170 007	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4170 009	Howard Properties	c/o Robert B. Friend 501 2 nd Street, #720 San Francisco, California 94107
4170 010 4170 011	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4171 001	Edward Elhauge & Patric Hoctel	1100 Tennessee Street San Francisco, California 94107
4171 002	Eoi Takagi	1102 Tennessee Street San Francisco, California
4171 003	Michael L. & Natasha E. Eklund	4740 Montgomery Lane Santa Rosa, California 95409
4171 004	Jeffrey W. Rader	1455 Shotwell Street San Francisco, California 94110
4171 005	Dennis J. & Anne M. Herrera	1116 Tennessee Street San Francisco, California 94107
4171 011	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4171 014 4171 015	Elena Accornero	c/o Rose Riccomini 72 Westgate Drive San Francisco, California 94127
4171 017	James W. Dilley	4371 23 rd Street San Francisco, California 94114
4171 020	Howard Properties	c/o Robert B. Friend 501 2 nd Street, #720 San Francisco, California 94107
4171 021 4171 022	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4171 025 4171 026 4171 027	Osa Associates III LLC	4248 23 rd Street San Francisco, California 94114
4171 028 4171 029 4171 030	Raul Arriaza & Denise et al.	4248 23 rd Street San Francisco, California 94114
4172 001	The Baldini Trust	c/o Baldini Property Management 4977 Mission Street San Francisco, California 94112
4172 002	Marky Lynn Quayle	2380 Broadway San Francisco, California 94115
4172 003	Charles A. & Emmery Lena Canepa	P.O. Box 170218 San Francisco, California 94117
4172 004	Inez W. Hunter Living Trust	2524 3 rd Street San Francisco, California 94107
4172 005	James T. & Margaret D. Amos	2530 3 rd Street San Francisco, California 94107
4172 006	Scott & Maria Jenerik	2538 3 rd Street San Francisco, California 94107
4172 007	Gary Kremen	2542 3 rd Street San Francisco, California 94107
4172 010	Philip J. & Jean E. Makanna 2000 Rev. Trust	665 Arkansas Street San Francisco, California 94107
4172 014	Leo Trust 2002	c/o Carol Alfaro 159 Shooting Star Isle Foster City, California 94404
4172 015	Robert C. MacPhee	P.O. Box 411567 San Francisco, California 94141
4172 016	Thomas T. Lundberg	2620 3 rd Street San Francisco, California 94107
4172 018	Raul Villasenor	2624 3 rd Street San Francisco, California 94107
4172 018A	Tagg Terryl & Scott Linda S.	1195 Tennessee Street San Francisco, California 94114
4172 019	Robert Noelke	1074 Tennessee Street San Francisco, California 94107
4172 020	Mercedes S. Gardner Living Trust	2638 3 rd Street San Francisco, California 94107

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4172 021	Anne K. Miller Trustee	735 Hillcrest Way Redwood City, California 94062
4172 022	Morton & Carol A. Rothman 2002 Trust	32 Greenside Way San Rafael, California 94901
4172 025	Breuer-Lundberg Family Trust 1999	c/o Thomas T. Lundberg & Mary K. Breuer 2620 3 rd Street San Francisco, California 94107
4172 027	Jesus J. & Ana M. Nevarez	1175 Alemany Boulevard San Francisco, California 94112
4172 028	Virgie L. Winchester	1133 Tennessee Street San Francisco, California 94107
4172 029	Irion Christopher H. Eslick Sus.	1129 Tennessee Street San Francisco, California 94107
4172 032	Henry Bargert	1117 Tennessee Street San Francisco, California 94107
4172 034	Steve & Clara L. Welch	19031 Carlton Avenue Castro Valley, California 94546
4172 034A	The Baldini Trust	c/o Baldini Property Management 4977 Mission Street San Francisco, California 94112
4172 034B	Douglas E. & Kathryn Gower	1125 De Haro Street San Francisco, California 94107
4172 035	Rudolph & Beatrice Churka Trust	686 Paris Street San Francisco, California 94112
4172 036	Jason G.W. & Catherine L.Y.L. Fong	1109 Tennessee Street San Francisco, California 94107
4172 038 4172 039	2572-80 Third Street LLC A Cal LL	742 4 th Avenue San Francisco, California 94118
4172 041 4172 044 4172 045 4172 046	Redland Group Inc.	1155 Tennessee Street San Francisco, California 94107
4172 047	Peter A. & Grace M. Furst	1121 Tennessee Street, #1 San Francisco, California 94107
4172 048	Betty Phan	1121 Tennessee Street, #2 San Francisco, California 94107
4172 049	Daniel Edward Kahler Rev. Trust	c/o Daniel Edward Kahler, Trustee 1121 Tennessee Street, #3 San Francisco, California 94107

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4172 050	Kevin M. McLeod	1121 Tennessee Street, #4 San Francisco, California 94107
4172 051	Hans Peter Gerber & Cat Tribouley	c/o Hans Peter Gerber 1121 Tennessee Street, #5 San Francisco, California 94107
4172 052	Jateen Parekh	1121 Tennessee Street, #6 San Francisco, California 94107
4172 053	Regan Carroll	1155 Tennessee Street San Francisco, California 94107
4172 054	2572-80 Third Street LLC A Cal LL	742 4 th Avenue San Francisco, California 94118
4172 055	2546 3 rd Street LLC	1254 41 st Avenue San Francisco, California 94122
4172 056	Raymond Miller Trustee	593 Texas Street San Francisco, California 94107
4172 057 4172 058 4172 059 4172 060 4172 061	2546 3 rd Street LLC	1254 41 st Avenue San Francisco, California 94122
4173 001	American Can Co.	2586 3 rd Street San Francisco, California 94107
4175 002 4175 006	Southern Energy Potrero LLC	c/o Mirant Potrero LLC 1350 Treat Boulevard, #500 Walnut Creek, California 94596
4175 007	Pacific Gas & Electric Company	c/o Building & Land Services Department P.O. Box 770000 Mail Code N10A San Francisco, California 94177
4227 001	Greg Bronstein	1200 Indiana Street San Francisco, California 94107-3406
4227 005	Cappelletti Family Trust	c/o John V. Cappelletti 379 Shotwell Street San Francisco, California 94110
4227 008 4227 009 4227 012	State Property	105 Harrison Street San Francisco, California 94105
4227 013 A	Sherman C. Little	25 Division Street San Francisco, California 94103

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4227 013B 4227 015 4227 016 4227 017 4227 018 4227 019 4227 020 4227 021 4227 026 4227 027 4227 028 4227 029 4227 030	State Property	105 Harrison Street San Francisco, California 94105
4227 031	Crespi Family 1989 Revoc. Trust	c/o Mr. & Mrs. Crespi, Trustees 1631 Silliman Street San Francisco, California 94134
4227 032	BBC Investment Company	251 Lafayette Circle Lafayette, California 94549
4227 033	State Property	105 Harrison Street San Francisco, California 94105
4227 034	The Phillips 1982 Trust	c/o Richard & Barbara Phillips 1675 Parrott Drive San Mateo, California 94402
4228 010	Potrero Warehouse Properties LLC	600 18 th Street San Francisco, California 94107
4228 015	1240 Minnesota Street Assoc. LLC	550 Townsend Street, Suite B San Francisco, California 94103
4228 017	Trinity Investments LLC	1150 25 th Street San Francisco, California 94103
4228 018	Lyle Sweeney	1099 23 rd Street, #1 San Francisco, California 94107
4228 019	John Hernon	1099 23 rd Street, #18 San Francisco, California 94107
4228 020	Leonard T. Guzman	203 E. Taylor Street, #1 San Jose, California 95112
4228 021	Nestor D. Matthews	1099 23 rd Street, #4 San Francisco, California 94107
4228 022	Soss 2002 Living Trust	1099 23 rd Street, #5 San Francisco, California 94107
4228 023	Paul A. Martson & Jennifer London	1099 23 rd Street, #6 San Francisco, California 94107

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4228 024	David W. Regan	1099 23 rd Street, #7 San Francisco, California 94107
4228 025	Lisa A. Novak	1099 23 rd Street, #18 San Francisco, California 94107
4228 026	Maynard Chen	1099 23 rd Street, #9 San Francisco, California 94107
4228 027	Dyana M. King	1099 23 rd Street, #10 San Francisco, California 94107
4228 028	Michelle Larner	1099 23 rd Street, #11 San Francisco, California 94107
4228 029	Bruce K. Huie	1099 23 rd Street, #12 San Francisco, California 94107
4228 030	Ronald A. Baker	4331 26 th Street San Francisco, California 94131
4228 031	Randy L. & Kim K. Sparks	1099 23 rd Street, #15 San Francisco, California 94107
4228 032	Cyril Meurillon	1099 23 rd Street, #16 San Francisco, California 94107
4228 033	Nessqo Enterprises Inc.	1099 23 rd Street, #17 San Francisco, California 94107
4228 034	Timothy G. Hernon	1099 23 rd Street, #18 San Francisco, California 94107
4228 035	Craig S. Forrest	1640 20 th Street San Francisco, California 94107
4228 036	Joseph A. & Maureen Hernon	1099 23 rd Street, #18 San Francisco, California 94107
4228 037	Sue Ling Wong	81 Parkgrove Drive South San Francisco, California 94080

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4228 038 4228 039 4228 040 4228 041 4228 042 4228 043 4228 044 4228 045 4228 046 4228 047 4228 048 4228 049 4228 050 4228 051 4228 052 4228 053 4228 054 4228 055 4228 056 4228 057	1207 Indiana Street Associates LLC	1443 16 th Avenue San Francisco, California 94122
4228 058	Lin Tzu Lun, Li Ya Wen, & Lin Che	1011 23 rd Street, Unit #1 San Francisco, California 94107
4228 059	Willy Sui Lon Ng & Bornya Fung P.	378 Bay Ridge Drive Daly City, California 94014
4228 060	Wayne F. Ellsworth	1011 23 rd Street, #3 San Francisco, California 94107
4228 061	Ronald A. Baker	4331 26 th Street San Francisco, California 94131
4228 062	Kimberly Ruth Dale	1011 23 rd Street, #5 San Francisco, California 94107
4228 063	John Paul Talty	550 Townsend Street, Suite B San Francisco, California 94103
4228 064	James B. Hurley	1011 23 rd Street, #7 San Francisco, California 94107
4228 065	Minna Lai	1011 23 rd Street, #8 San Francisco, California 94107
4228 066	David & Chris Stamation	345 Granada Avenue San Francisco, California 94112
4228 067	Angus W. Barnett	1945 Washington Street, #502 San Francisco, California 94109
4228 068	Stuart & Laura Gold	17 Pepperwood Lane Danville, California 94508

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4228 069	Deren Baker	1011 23 rd Street, #12 San Francisco, California 94107
4228 070	Philip Yau	1011 23 rd Street, #21 San Francisco, California 94107
4228 071	John Paul Talty	1443 16 th Avenue San Francisco, California 94122
4228 072	Timothy Wighton	201 S. Ithan Avenue Bryn Mawr, Pennsylvania 19010
4228 073	Rick Bostian	1011 23 rd Street, #16 San Francisco, California 94107
4228 074	Achim Voermanek	1011 23 rd Street, #17 San Francisco, California 94107
4228 075	Randy Bobst-McKay	P.O. Box 372 San Francisco, California 94104
4228 076	Jennifer Zanich	1011 23 rd Street, #19 San Francisco, California 94107
4228 077	Chad Burns & Todd Suchevids	1011 23 rd Street, #20 San Francisco, California 94107

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4228 080	Indiana Live/Work Assoc. LLC	c/o Ram Development 600 18 th Street San Francisco, California 94107
4228 081		
4228 082		
4228 083		
4228 084		
4228 085		
4228 086		
4228 087		
4228 088		
4228 089		
4228 090		
4228 091		
4228 092		
4228 093		
4228 094		
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4228 097		
4228 098		
4228 099		
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4228 116		
4228 117		
4228 118		
4228 119		
4228 120		
4228 121		
4228 122		
4228 123		
4228 124		
4228 125		
4228 126		
4228 127		

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4228 128 4228 129 4228 130 4228 131 4228 132 4228 133 4228 134 4228 135 4228 136 4228 137 4228 138 4228 139 4228 140 4228 141 4228 142 4228 143 4228 144 4228 145 4228 146 4228 147 4228 148 4228 149 4228 150 4228 151 4228 152 4228 153 4228 154 4228 155 4228 156 4228 157	Minnesota Live/Work Assoc. LLC	600 18 th Street San Francisco, California 94107
4229 002	Fuller Family Properties LLC	10610 Wimbledon Drive Rancho Mirage, California 92270
4229 003	Margaret Rocchia Living Trust	1237 Minnesota Street San Francisco, California 94110
4229 004	Fuller Family Properties LLC	10610 Wimbledon Drive Rancho Mirage, California 92270
4230 001	Ryder Truck Rental Inc.	c/o Property Tax Department P.O. Box 25719 Miami, Florida 33102
4231 002	Shriner's Hospital for Cripples	c/o Delano Brothers 1300 Illinois Street San Francisco, California 94107
4231 004	Park Exemption Trust	1820 Sweetwood Drive Colma, California 94015

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4231 005	Chris A. & Paula M. Tulley	937 Vienna Street San Francisco, California 94112
4232 001	Southern Energy Potrero LLC	c/o Mirant Potrero LLC 1350 Treat Boulevard, Suite 500 Walnut Creek, California 94596
4232 003 4232 004 4232 005	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4232 006 4232 007 4232 008 4232 009	Southern Energy Potrero LLC	c/o Mirant Potrero LLC 1350 Treat Boulevard, Suite 500 Walnut Creek, California 94596
4232 010	Harrigan Weidenmuller Co.	c/o Tim Muller 300 Montgomery Street, Suite 800 San Francisco, California 94104
4241 002 4241 003	Mary Battaini	P.O. Box 77004 San Francisco, California 94107-0004
4241 004	Sheedy Inc.	P.O. Box 77004 San Francisco, California 94107
4244 002	Mary Battaini	P.O. Box 77004 San Francisco, California 94107-0004
4244 003 4244 004	Sheedy Inc.	P.O. Box 77004 San Francisco, California 94107
4245 001	Anderson Rowe, & Buckley Inc.	c/o Richard I. Buckley 2833 3 rd Street San Francisco, California 94107
4245 002	Joyce M. Foley & Gail A. Russo	c/o J. Foley 26079 Table Meadow Road Auburn, California 95602-8958
4246 001	John Anthony Tedesco	2800 3 rd Street San Francisco, California 94107
4246 003	Equilon Enterprises LLC	c/o Equiva Services LLC P.O. Box 4369 Houston, Texas 77210-4369
4246 004	The Frank E. Lawson Trust	1495 Tennessee Street San Francisco, California 94107
4247 002	Richard P. & Carol A. Gentschel	c/o Richard P. & Carol Gentschel 115 Lochinvar Road San Rafael, California 94901

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4247 003	Glenn Maka & Alexis McNulty	1400 Tennessee Street San Francisco, California 94107
4247 004	Satoru & Carolyn K. Hosoda	1444 Tennessee Street San Francisco, California 94107
4288 003	Yellow Cab Cooperative Inc.	c/o James E. Steele 1200 Mississippi Street San Francisco, California 94107
4288 004 4288 005 4288 006	Bay West Falaschi-Cox #1	2 Henry Adams Street, #450 San Francisco, California 94103
4290 008	Jaffe Revocable Trust	c/o Joshua & Zara Jaffe 1500 Oak Rim Drive Hillsborough, California 94010
4290 010	Dennis C. & Linda L. Magri	148 Marietta Drive San Francisco, California 94127
4290 011	Patrick & Wendy McCann	3125 Canyon Road San Francisco, California 94010
4290 012	Dennis C. Magri	148 Marietta Drive San Francisco, California 94127
4290 014	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4290 015 4290 016	John & Ida M. Giotta	c/o Gianfranco Giotta 1045 Lea Drive San Rafael, California 94903
4290 017	Mohebbi Saeid	1455 25 th Street San Francisco, California 94107
4290 018	Peninsula Corridor Joint Powers Board	
4291 015	Triple A Machine Shop Inc.	32 Washington Avenue Point Richmond, California 94801
4291 017	State Property	105 Harrison Street San Francisco, California 94105
4291 018	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4292 008 4292 009	State Property	105 Harrison Street San Francisco, California 94105
4292 012	Nicholas L. & Susan M. Bates	P.O. Box 42 Belvedere, California 94920

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4293 006	Hermco Inc.	1850 Ralston Avenue Hillsborough, California 94010
4293 012 4293 013 4293 014 4293 015 4293 016 4293 018	Berliner Investment Co.	c/o Ed Berliner 76 Peacock Drive San Rafael, California 94901
4293 019	Tedesco Family Trust	1450 Purisima Creek Road Half Moon Bay, California 94109
4293 020	Luther L. Knox	1415 Indiana Street, #102 San Francisco, California 94107
4293 021	Tedesco Family Trust	c/o John A. & Samantha S. Tedesco, Trustees 1450 Purisima Creek Road Half Moon Bay, California 94109
4293 022	James B. Hurley	1193 Church Street San Francisco, California 94114
4293 023	Tedesco Family Trust	1450 Purisima Creek Road Half Moon Bay, California 94109
4293 024	Catherine T. Doyle	c/o Catherine T. Doyle & Bradford E.T. 1415 Indiana Street, #106 San Francisco, California 94107
4293 025	Drawdy Family Trust	16 Farm Road San Rafael, California 94903
4293 026	Lisa M. Fazendin	1415 Indiana Street, #202 San Francisco, California 94107
4293 027	Diane Lee Withelder Trust	227 Romain San Francisco, California 94131
4293 028	Brian J. Rodrigues	1220 Edgewood Road Redwood City, California 94062
4293 029	Tedesco Family Trust	1450 Purisima Creek Road Half Moon Bay, California 94019
4293 030	Nathan Zaidenweber	1415 Indiana Street, #206 San Francisco, California 94107
4293 031	H. Charles Gebhard	1415 Indiana Street, #301 San Francisco, California 94107
4293 032	George F. Demarest	P.O. Box Belmont, California 94002
4293 033	Brian J. Rodrigues	1220 Edgewood Road Redwood City, California 94062

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4293 034	Robert Roy Garcia	c/o Therien & Co. 411 Vermont Street San Francisco, California 94107
4293 035	Noah Berland	1816 5 th Street Berkeley, California 94710
4293 036	Philip M. Frederico	1415 Indiana Street, #306 San Francisco, California 94107
4294 003	Jerry Ivy Separate Prop Rev. Trust	c/o Jerry L. Ivy 450 Ferguson Drive Mountain View, California 94043-5214
4294 012	Michael D. Grenier	1500 Tennessee Street San Francisco, California 94107
4294 013 4294 014 4294 015	Tan 2001 Family Trust	c/o Christopher & Pearl Tan, Trustees 1331 31 st Avenue San Francisco, California 94122
4294 016	Fred S. & Nancy Pang	1425 Minnesota Street San Francisco, California 94107
4294 017 4295 003	Jerry Ivy Separate Prop. Rev. Trust	c/o Jerry L. Ivy 450 Ferguson Drive Mountain View, California 94043-5214
4295 007 4295 008 4295 009 4295 011 4295 013 4295 014 4295 015	Carella Properties LLC	c/o Christine Carella Waldeck 875 Autumn Lane Mill Valley, California 94941
4295 010	Carella Properties LLC	c/o KZ Tile Co. 1551 Tennessee Street San Francisco, California 94107
4296 005 4296 010	Josephine Dentoni Inc.	c/o John M. Dentoni, Sr. 2820 Summit Drive Burlingame, California 94010
4296 015	Jerry R. Barrish	315 Shoreside Drive Pacifica, California 94044
4296 016	Bowles Eckstrom & Associates LLC	2290 S. 10 th Street San Jose, California 94112
4296 017	Jerry Barrish	315 Shoreside Drive Pacifica, California 94044

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4314 001	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4314 001A	Sixteen First Street Inc.	c/o Donald E. Levy 572 Ruger Street, Suite A San Francisco, California 94129-0430
4315 008	William D. & Claire S. Spencer 95 Living Trust	c/o William Spencer Company 21 South Hill Drive Brisbane, California 94005
4315 013	William D. & Claire S. Spencer 95 Living Trust	c/o William Spencer 99 South Hill Drive Brisbane, California 94005
4316 001	Marie O. Lipman	c/o Catherine M. O'Gara, M.D. 115 Pacheco Street San Francisco, California 94116
4316 002	WoCo Inc.	c/o Consolidated Merchandising 157 7 th Avenue San Francisco, California 94118
4317 012	Paolo & Erin Costa	18 Apollo Road Belvedere Tiburon, California 94920
4317 014	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4317 015	Mitchell & Michael Properties	1580 Indiana Street San Francisco, California 94107
4317 017 4317 018	Steiner Corporation	c/o Jan Sundberg 505 E. South Temple Salt Lake City, Utah 84118
4318 011 4318 012 4318 015	Mitchell & Michael Properties	1580 Indiana Street San Francisco, California 94107
4318 017	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4318 018	State Property	105 Harrison Street San Francisco, California 94105
4318 020	1578 Indiana Corp.	601 Indiana Street San Francisco, California 94107
4318 021	1588 Indiana Corp.	133 Flying Mist Isle Foster City, California 94404

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4318 022	Anjanette Y. Pong	1568 Indiana Street, Unit #1 San Francisco, California 94107
4318 023	Paul Wilkens	1568 Indiana Street, #2 San Francisco, California 94107
4318 024	Young Chi Kim	1568 Indiana Street, #3 San Francisco, California 94107
4318 025	Randy Cordeiro	1568 Indiana Street, #4 San Francisco, California 94107
4318 026	Michael Bernard	1568 Indiana Street, #5 San Francisco, California 94107
4318 027	Geoffrey P. Toeter	1568 Indiana Street, #6 San Francisco, California 94107
4318 028	James Cohill	1568 Indiana Street, #7 San Francisco, California 94107
4318 029	Gordon C. Lyon	1568 Indiana Street, #8 San Francisco, California 94107
4318 030 4318 031 4318 032 4318 033 4318 034 4318 035 4318 036 4318 037 4318 041	1588 Indiana Corporation	133 Flying Mist Isle Foster City, California 94404
4318 042 4318 047 4318 048 4318 049 4318 050 4318 051 4318 053	1578 Indiana Corporation	c/o Eddie Yim, President 133 Flying Mist Isle Foster City, California 94404
4347 001	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4347 010	The Hearst Corporation	c/o Hearst Service Center Tax/Audit Department 227 West Trade Street Charlotte, North Carolina 28202
4347A 003	Wells Fargo Bank Northwest, N.A.	c/o Shurgard Storage Centers, Inc. 1155 Valley Street, Suite 400 Seattle, Washington 98109

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4347A 004	M-O San Francisco LP	c/o McMahon Development Group 380 Stevens Avenue, Suite 313 Solana Beach, California 92075
4347B 002	Sommers Inter Vivos Trust	c/o William Sommers 616 Acacia Lane Redwood City, California 94062
4347B 004 4347B 005	State Property	105 Harrison Street San Francisco, California 94105
4347B 006	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4347B 007	State Property	105 Harrison Street San Francisco, California 94105
4349 001	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4349 002 4349 002A	State Property	105 Harrison Street San Francisco, California 94105
4349 003A 4349 003B	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4349 004 4349 004A	Southern Pacific Transportation Co.	
4349 011	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4349 012 4349 013	State Property	105 Harrison Street San Francisco, California 94105
4349 014	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4349 015	Federated Metals Corporation	c/o Bridgeview Management Co. Inc. 1160 State Street Perth Amboy, New Jersey 08861
4349 016	The Hearst Corporation	c/o Hearst Service Center Tax/Audit Department 227 West Trade Street Charlotte, North Carolina 28202
4349A 004A	Southern Pacific Transportation Company	

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
4352 001 4352 006 4352 007 4353 001	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4353 008	Alfred Lee & Tam Yin Kwan	1320 Marin Street San Francisco, California 94124
4353 009	Mark, Esther, Catherine, Ki Yang	c/o Mr. Yang 131 16 th Avenue San Francisco, California 94118
4381 001 4381 004	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
4382 003	State Property	105 Harrison Street San Francisco, California 94105
4382 004 4382 005 4382 006	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
5211 010 5211 011 5211 027	Jean J. Hebert	875 Duncan Street San Francisco, California 94131
5211 028	Salvarezza Family Trust	c/o Robert M. & Alice Salvarezza 398 Jefferson Street San Francisco, California 94133
5211 029	Ruben A. Santana	112 Cascade Drive Fairfax, California 94930
5211 030	Sojourner Truth Foster Family	c/o Alma Jackson 3450 3 rd Street, Suite 1C San Francisco, California 94124
5211 031	Lance Lee	235 Edgewood Avenue San Francisco, California 94117
5211 032	Baker Places Inc.	310 Townsend Street, Suite 400 San Francisco, California 94107
5211 033	Ivo & Teresa Cardelli Family Trust	c/o Ivo & Teresa Cardelli 2335 Crestmoor Drive San Bruno, California 94066
5211 034	Hong Chen	1880 16 th Avenue San Francisco, California 94122
5211 035	Robert & Catherine Larson	3450 3 rd Street, #3B San Francisco, California 94124
5211 036	Robert & Catherine Larson	3450 3 rd Street, #3B San Francisco, California 94124

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
5211 037	Iscoff Survivors Trust	c/o Roean Iscoff 2190 Broadway Street, Apt. 3E San Francisco, California 94115
5211 038	Carl & Barbara Stewart Trust	30 Corte Picesa Millbrae, California 94030
5211 039	Research Data Group Inc.	3450 3 rd Street, #3F San Francisco, California 94124
5211 040	D.B. & K.D. McCall Rev. Trust	c/o Daniel McCall et al. 888 Brannan Street, 6 th Floor San Francisco, California 94103
5211 041	Niles D. & Lois I. Heins	c/o Angus Meat Outlet P.O. Box 88523 San Francisco, California 94188
5211 042	Cypress Book Company	3450 3 rd Street, Suite 4B San Francisco, California 94124
5211 043	Thomas D. & Camilla M. Demee	3450 3 rd Street, Suite 4C San Francisco, California 94124
5211 044 5211 045	Thomas & Janet Griggs	3450 3 rd Street, Suite 4D San Francisco, California 94124
5211 046	Rudolph A. Scherer Trustee	549 Tahos Road Orinda, California 94563
5211 047	Miguel A. Cheng	101 Quint Street San Francisco, California 94124
5211 048	Ali R. Nyaiesh	P.O. Box 880204 San Francisco, California 94188
5211 049	The Robert Craft Family Trust	c/o Robert R. Craft 10 Regent Court Novato, California 94947
5211 050	Sonny C. & Lily L. Yuen	737 Acacia Avenue San Bruno, California 94066-3303
5211 051	John G. Sheridan	3450 3 rd Street, #5E San Francisco, California 94124
5211 052	Retirement Plan & Trust	c/o Jonathan Lee 362 Capistrano Avenue San Francisco, California 94112
5211 053	Gary Wong	P.O. Box 885256 San Francisco, California 94188
5211 054	Orlan & Catherine Demaria	P.O. Box 510 Tahoma, California 96142

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
5212 026 5212 027	Richard B., Theodore K., & John R. Meyer	c/o Ventana Property Services 695 Oak Grove Street, Suite 200 Menlo Park, California 94025
5214 001 5214 004	Southern Pacific Transportation Company	
5215 016	State Property	105 Harrison Street San Francisco, California 94105
5215 017	Edith B. Johnson	1430 16 th Avenue San Francisco, California 94122
5215 020	State Property	105 Harrison Street San Francisco, California 94105
5215 021 5215 022	Murray G. Cole	1650 Davidson Avenue San Francisco, California 94124
5216 002	The Lowpensky Family Trust	c/o Legallet 1401 Griffith Street San Francisco, California 94124
5216 028	Richard B. Meyer Partnership	c/o Ventana Property Services 695 Oak Grove Street, Suite 200 Menlo Park, California 94025
5216 029	Theodore G. Meyer & Sons	c/o Ventana Property Services 695 Oak Grove Street, Suite 200 Menlo Park, California 94025
5216 030	One Thousand Green Co.	c/o Theodore G. Meyer & Sons 695 Oak Grove Street, Suite 200 Menlo Park, California 94025
5217 001	Theodore K. Meyer Partnership	c/o Ventana Property Services 695 Oak Grove Street, Suite 200 Menlo Park, California 94025
5217 002	The Lowpensky Family Trust	c/o Theodore M. Lowpensky 2430 Summit Drive Hillsborough, California 94010
5217 003	Survivors Trust	1659 Mason Street San Francisco, California 94133
5217 004	The Lowpensky Family Trust	c/o Theodore M. Lowpensky 2430 Summit Drive Hillsborough, California 94010
5226 012	1680 & 1698 Evans Avenue LLC	c/o Barbara H. Christianson Boulder Creek, California 95006
5226 020 5226 021	John T. & Laura W. Cheng	1465 Davidson Avenue San Francisco, California 94124

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
5226 022	Salvarezza Family Trust	c/o Robert M. Salvarezza 110 Braemar Drive Hillsborough, California 94010
5226 023 5226 024	Barbara I. Cavell Separate Proty Family 1994 Trust	c/o Barbara I. Cavella, Trustee 2550 Roundhill Drive Alamo, California 94507
5226 025	Soldavini Family Living Trust	c/o Henry A. and J.Q. Soldavini 60 Pine Oaks Road Oroville, California 95966
5226 026 5226 029 5226 030	Calmco Investment Co. Inc.	945 Link Road Hillsborough, California 94903
5226 027	Frank and Mary Battaglia Rev. Trust	9 Mahogany Drive San Rafael, California 94903
5226 028	New SF Bait Distributors	1401 Davidson Avenue San Francisco, California 94124
5227 001	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133
5228 001 5228 011 5228 012 5231 001	State Property	105 Harrison Street San Francisco, California 94105
5231 002B	Southern Pacific Transportation Co.	
5231 004 5231 005 5231 006	Interstate Brands Corp.	c/o Ray S. Sutton, Esq. 12 E. Armour Boulevard Kansas City, Missouri 64111
5232 001A	Mary Circosta 1994 Revoc. Trust	c/o Nick Circosta 1801 Evans Avenue San Francisco, California 94124
5232 002	Peninsula Corridor Joint Powers Board	
5232 002A	Southern Pacific Transportation Co.	
5232 004	State Property	105 Harrison Street San Francisco, California 94105
5232 005	Mary Circosta 1994 Revoc. Trust	c/o Nick Circosta 1801 Evans Avenue San Francisco, California 94124

**APPENDIX B
LANDOWNERS WITHIN 500 FEET OF THE UNDERGROUND PIPELINE**

APN (Block Lot)	Owner(s)	Address
5232 006	Peninsula Corridor Joint Powers Board	
5232 007	John A. & Dorothy A. Michael Rev. Trust	c/o John A. & Dorothy A. Michael 170 Los Robles Drive Burlingame, California 94010
5246 050	Maurizio S. Re	c/o Teresa M. Re 390 Selby Street San Francisco, California 94124
5246 052	Growers Refrigeration Co.	2050 Galvez Avenue San Francisco, California 94124
5246 053	Frank Balzarini & Ge Balzarini	c/o Alfred J. & Joan C. Fioresi 28 Driftwood Court San Rafael, California 94901
5262 002 5262 003 5262 007	San Mateo County Transportation	c/o Gerald T. Haugh 1250 San Carlos Avenue San Carlos, California 94070
5262 004 5262 009	City Property	F/Y Dreadnaught 1288 Columbus Avenue PMB 109 San Francisco, California 94133

APPENDIX C
PUBLIC HEALTHDATA

APPENDIX C PUBLIC HEALTH DATA

- C1 HAP Emission Rates
- C2 Cooling Tower and Odor Control System ISC Model Input/Output
(Excerpts)
- C3 ACE 2588 Model Output (Excerpts)

C1 HAP EMISSION RATES

Cooling Tower and Odor Control System Emission Rates
Potrero Unit 7 Project

HAP Emissions from Cooling Tower				
Water Rate	140000	gpm		
Drift Rate	0.0005	%		
Number of Cells	14			
			Emission Rate	
Maximum Conc. ¹			lb/hr	g/s/cell
Chrome	6.5	ug/l	2.28E-06	2.05E-08
Copper	72.5	ug/l	2.54E-05	2.29E-07
Lead	0.0935	ug/l	3.28E-08	2.95E-10
Mercury	19.5	ug/l	6.84E-06	6.16E-08
Nickel	12.5	ug/l	4.38E-06	3.95E-08
Selenium	2.5	ug/l	8.77E-07	7.90E-09
Zinc	312	ug/l	1.09E-04	9.86E-07

1: See "Representative Water Analysis" page following.

HAP Emissions from Odor Control System						
Water Treated	4.7	million gal/day				
			Uncontrolled ¹		Controlled ²	
Emissions ³	lb/yr/mgd	lb/year	lb/day	lb/year	lb/day	gm/sec
Total VOC	190	893.00	2.45	446.50	1.22	6.43E-03
Benzene	1.7	7.99	0.02	4.00	0.01	5.75E-05
Ethyl Benzene	1.2	5.64	0.02	2.82	0.01	4.06E-05
Toluene	7.3	34.31	0.09	17.16	0.05	2.47E-04
Xylenes	7	32.90	0.09	16.45	0.05	2.37E-04
1,1,1 TCA	6.5	30.55	0.08	15.28	0.04	2.20E-04
Chloroform	4.7	22.09	0.06	11.05	0.03	1.59E-04
Methylene Chloride	4.3	20.21	0.06	10.11	0.03	1.45E-04
Tetrachloroethylene	8.5	39.95	0.11	19.98	0.05	2.88E-04
Acetone	3.20E-02	1.50E-01	4.12E-04	7.52E-02	2.06E-04	1.08E-06
MEK	6.40E-03	3.01E-02	8.24E-05	1.50E-02	4.12E-05	2.17E-07
MIBK	5.80E-03	2.73E-02	7.47E-05	1.36E-02	3.73E-05	1.96E-07

1: Assumes annualized usage of 8760 hours per year.

2: Control efficiency 50 percent

3: See "Conservative Screening Emission Factors" second page following.

REPRESENTATIVE WATER ANALYSIS

1. Makeup water to cooling tower (Recycled Water).
 2. Estimated cooling tower water characteristics (5 concentration cycles).

	Unit	1	2					
Calcium (Ca ⁺⁺)	mg/l	29	145					
Magnesium . . . (Mg ⁺⁺)	mg/l	42	210					
Sodium (Na ⁺)	mg/l	361	1805					
Potassium (K ⁺)	mg/l	23	115					
TOTAL CATIONS								
Bicarbonate . (HCO ₃ ⁻)	mg/l	225	225					
Carbonate . . . (CO ₃ ⁻)	mg/l							
Hydroxide (OH ⁻)	mg/l							
Chloride (Cl ⁻)	mg/l	581	2905					
Sulfate (SO ₄ ⁻)	mg/l	120	1308					
Nitrates (NO ₃ ⁻)	mg/l							
TOTAL ANIONS								
Silica	mg/l	12.7	65					
Total Suspended Solids	mg/l	1	5 - 15					
pH	pH units	7.5	8 - 8.5					
Oil & Grease	mg/l	< 1.0	5					
Fluoride	mg/l	1.2	6					
TDS	mg/l	1390	7000					
Phosphorus (PO ₄)	mg/l	1 - 3	15 - 20					
Ammonia Nitrogen	mg/l	4 - 5	25					
BOD	mg/l	5 - 15	50					
Chromium*	ug/l	1.3	6.5					
Copper*	ug/l	14.5	72.5					
Mercury*	ug/l	0.0187	0.0935					
Nickel*	ug/l	3.9	19.5					
Lead*	ug/l	2.5	12.5					
Selenium*	ug/l	0.5	2.5					
Zinc*	ug/l	62.4	312					

* Concentrations of metals was obtained from NPDES permitting information for the SEWPCC. Metals will not be added in the power plant cooling system. Evaporation of water in the cooling system will cause in increase in metal concentration in the cooling system.

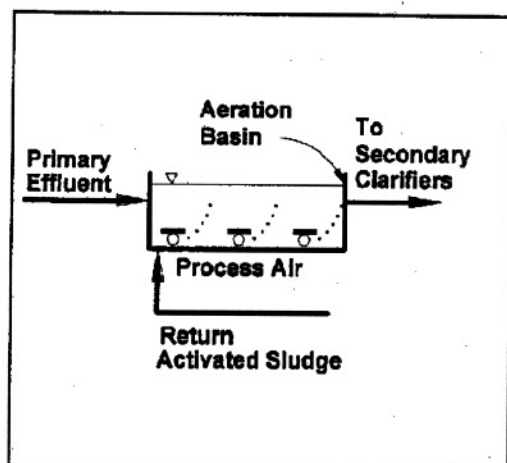
Section 3.4.2.1

Emission Source Description

Category: Biological Treatment

Source: Diffused Air Activated Sludge

Description: The diffused air activated sludge process requires the use of large volumes of air (79 percent nitrogen, 21 percent oxygen), diffused through the liquid stream to achieve dissolution of the oxygen into the liquid. The aerobic biomass requires steady levels of dissolved oxygen to maintain optimum biodegradation activity. Many facilities employ fine bubble diffusers to increase oxygen transfer efficiency. Fine bubble diffusers can be designed with either grids of diffuser plates or domes on the floor of the aeration tank, or attached fine bubble diffusers on the air distribution arms on one side of the tank. Other facilities employ distinctive coarse patterns for each type.



Emission Mechanisms: Emission mechanisms include surface volatilization, transport within rising air bubbles, release from aerosol particles in high-shear (mixed) processes, and weir drop emissions. Other mechanisms compete for organic matter and will impact emissions. These include biodegradation and solids adsorption.

Typical Air Stream Total VOC Concentrations:

1 to 10 ppmvC

Applicable Estimation Methods

Mass Balance
Emission Factor
Modeling
Direct Measurement

Mass balance not appropriate due to extensive solids sorption and biological activity. Emission factors and modeling are acceptable. Direct measurement costly but accurate.

Conservative Screening Emission Factors

Pollutant	Flow Based (lb/yr/mgd)	Conc. Based (lb/lb influent)	Comments
Total VOCs (Method 25.2)	190	0.13	Emission factors may be affected by process operating characteristics. Consideration should be given to factors such as gas:liquid ratio and surface area per mgd.
Volatile/Degradable			
Benzene	1.7	0.18	
Ethyl Benzene	1.2	0.15	
Toluene	7.3	0.16	
Xylenes	7.0	0.11	
Volatile/Non-Degradable			
1,1,1-Trichloroethane	6.5	0.46	
Chloroform	4.7	0.26	
Methylene Chloride	4.3	0.13	
Tetrachloroethylene	8.5	0.33	
Non-Volatile/Degradable			
Acetone	3.2E-02	9.9E-06	
MEK	6.4E-3	1.7E-4	
MIBK	5.8E-03	1.7E-05	

**C2 COOLING TOWER AND ODOR CONTROL SYSTEM ISC
MODEL INPUT/OUTPUT (EXCERPTS)**

*** ISCST3 - VERSION 02035 ***

*** Potrero Units 7 and 8 Includes Cooling Tower
*** HRA

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**MODELOPTs:

CONC

URBAN ELEV

GRDRIS

*** MODEL SETUP OPTIONS SUMMARY ***

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

-- SCAVENGING/DEPOSITION LOGIC --

**Model Uses NO DRY DEPLETION. DDPLETE = F

**Model Uses NO WET DEPLETION. WDPLETE = F

**NO WET SCAVENGING Data Provided.

**NO GAS DRY DEPOSITION Data Provided.

**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:

1. Gradual Plume Rise.
2. Stack-tip Downwash.
3. Buoyancy-induced Dispersion.
4. Calms Processing Routine.
5. Not Use Missing Data Processing Routine.
6. Default Wind Profile Exponents.
7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Assumes No FLAGPOLE Receptor Heights.

**Model Calculates 1 Short Term Average(s) of: 1-HR
and Calculates PERIOD Averages

**This Run Includes: 15 Source(s); 2 Source Group(s); and 2267 Receptor(s)

**The Model Assumes A Pollutant Type of: XQ

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:

Model Outputs Tables of PERIOD Averages by Receptor

Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)

Model Outputs External File(s) of Concurrent Values for Postprocessing (POSTFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Anem. Hgt. (m) = 10.00 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 1.4 MB of RAM.

**Input Runstream File: hra.dta

**Output Print File: hra.lst

*** ISCST3 - VERSION 02035 ***

*** Potrero Units 7 and 8 Includes Cooling Tower
*** HRA

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**MODELOPTs:
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*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
CT1	0	0.10000E+01	554330.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT2	0	0.10000E+01	554344.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT3	0	0.10000E+01	554358.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT4	0	0.10000E+01	554372.0	4178716.0	7.6	20.91	298.00	9.14	10.26	YES	
CT5	0	0.10000E+01	554386.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT6	0	0.10000E+01	554400.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT7	0	0.10000E+01	554414.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT8	0	0.10000E+01	554428.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT9	0	0.10000E+01	554442.0	4178715.0	7.6	20.91	298.00	9.14	10.26	YES	
CT10	0	0.10000E+01	554456.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT11	0	0.10000E+01	554470.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT12	0	0.10000E+01	554484.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT13	0	0.10000E+01	554498.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
CT14	0	0.10000E+01	554512.0	4178714.0	7.6	20.91	298.00	9.14	10.26	YES	
ODORCNT	0	0.10000E+01	554442.3	4178752.8	7.6	6.10	298.00	15.29	0.48	YES	

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID

SOURCE IDs

1 CT1 , CT2 , CT3 , CT4 , CT5 , CT6 , CT7 , CT8 , CT9 , CT10 , CT11 , CT12 ,
CT13 , CT14 ,

2 ODORCNT ,

*** ISCST3 - VERSION 02035 ***

*** Potrero Units 7 and 8 Includes Cooling Tower
*** HRA

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**MODELOPTS:

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*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: CT1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	18.3	17.9	0	12	18.3	18.5	0
13	27.4	24.7	0	14	27.4	26.0	0	15	27.4	26.4	0	16	27.4	26.1	0	17	27.4	24.9	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	16.6	147.9	0	24	16.6	120.7	0
25	16.6	89.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	27.4	24.7	0	32	27.4	26.0	0	33	27.4	26.4	0	34	27.4	26.1	0	35	27.4	24.9	0	36	16.6	205.0	0

SOURCE ID: CT2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	27.4	22.8	0
13	27.4	24.7	0	14	27.4	26.0	0	15	27.4	26.4	0	16	27.4	26.1	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	16.6	147.9	0	24	16.6	120.7	0
25	16.6	89.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	27.4	24.7	0	32	27.4	26.0	0	33	27.4	26.4	0	34	27.4	26.1	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT3

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	27.4	22.8	0
13	27.4	24.7	0	14	27.4	26.0	0	15	27.4	26.4	0	16	27.4	26.1	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	16.6	147.9	0	24	16.6	120.7	0
25	16.6	89.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT4

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	27.4	22.8	0
13	27.4	24.7	0	14	27.4	26.0	0	15	27.4	26.4	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	16.6	147.9	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

**MODELOPTs:

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*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: CT5

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	27.4	20.1	0	12	27.4	22.8	0
13	27.4	24.7	0	14	27.4	26.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT6

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	27.4	20.1	0	12	27.4	22.8	0
13	27.4	24.7	0	14	27.4	26.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT7

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	16.6	170.5	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT8

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	38.0	68.9	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

**MODELOPTS:
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*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: CT9

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	16.6	188.0	0	22	38.0	68.9	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	38.0	73.5	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT10

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	16.6	188.0	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	38.0	62.4	0	22	38.0	68.9	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT11

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	16.6	199.8	0	3	38.0	62.4	0	4	16.6	170.5	0	5	16.6	147.9	0	6	16.6	120.7	0
7	16.6	89.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	16.6	199.8	0	21	38.0	62.4	0	22	38.0	68.9	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

SOURCE ID: CT12

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6	205.5	0	2	38.0	55.9	0	3	38.0	62.4	0	4	38.0	68.9	0	5	38.0	73.4	0	6	38.0	75.8	0
7	38.0	75.8	0	8	16.6	56.3	0	9	16.6	21.0	0	10	16.6	52.3	0	11	16.6	86.1	0	12	16.6	117.2	0
13	16.6	144.8	0	14	16.6	168.0	0	15	16.6	186.0	0	16	16.6	198.4	0	17	16.6	204.8	0	18	16.6	205.0	0
19	16.6	205.5	0	20	38.0	55.9	0	21	38.0	62.4	0	22	38.0	68.9	0	23	38.0	73.4	0	24	38.0	75.8	0
25	38.0	75.8	0	26	16.6	56.3	0	27	16.6	21.0	0	28	16.6	52.3	0	29	16.6	86.1	0	30	16.6	117.2	0
31	16.6	144.8	0	32	16.6	168.0	0	33	16.6	186.0	0	34	16.6	198.4	0	35	16.6	204.8	0	36	16.6	205.0	0

*** ISCST3 - VERSION 02035 ***

*** Potrero Units 7 and 8 Includes Cooling Tower
*** HRA

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**MODELOPTs:
CONC

URBAN ELEV

GRDRIS

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: CT13

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6,	205.5,	0	2	38.0,	55.9,	0	3	38.0,	62.4,	0	4	38.0,	68.9,	0	5	38.0,	73.4,	0	6	38.0,	75.8,	0
7	38.0,	75.8,	0	8	16.6,	56.3,	0	9	16.6,	21.0,	0	10	16.6,	52.3,	0	11	16.6,	86.1,	0	12	16.6,	117.2,	0
13	16.6,	144.8,	0	14	16.6,	168.0,	0	15	16.6,	186.0,	0	16	16.6,	198.4,	0	17	16.6,	204.8,	0	18	16.6,	205.0,	0
19	16.6,	205.5,	0	20	38.0,	55.9,	0	21	38.0,	62.4,	0	22	38.0,	68.9,	0	23	38.0,	73.4,	0	24	38.0,	75.8,	0
25	38.0,	75.8,	0	26	16.6,	56.3,	0	27	16.6,	21.0,	0	28	16.6,	52.3,	0	29	16.6,	86.1,	0	30	16.6,	117.2,	0
31	16.6,	144.8,	0	32	16.6,	168.0,	0	33	16.6,	186.0,	0	34	16.6,	198.4,	0	35	16.6,	204.8,	0	36	16.6,	205.0,	0

SOURCE ID: CT14

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	38.0,	49.6,	0	2	38.0,	55.9,	0	3	38.0,	62.4,	0	4	38.0,	68.9,	0	5	38.0,	73.4,	0	6	38.0,	75.8,	0
7	38.0,	75.8,	0	8	16.6,	56.3,	0	9	16.6,	21.0,	0	10	16.6,	52.3,	0	11	16.6,	86.1,	0	12	16.6,	117.2,	0
13	16.6,	144.8,	0	14	16.6,	168.0,	0	15	16.6,	186.0,	0	16	16.6,	198.4,	0	17	16.6,	204.8,	0	18	16.6,	205.0,	0
19	38.0,	49.6,	0	20	38.0,	55.9,	0	21	38.0,	62.4,	0	22	38.0,	68.9,	0	23	38.0,	73.4,	0	24	38.0,	75.8,	0
25	38.0,	75.8,	0	26	16.6,	56.3,	0	27	16.6,	21.0,	0	28	16.6,	52.3,	0	29	16.6,	86.1,	0	30	16.6,	117.2,	0
31	16.6,	144.8,	0	32	16.6,	168.0,	0	33	16.6,	186.0,	0	34	16.6,	198.4,	0	35	16.6,	204.8,	0	36	16.6,	205.0,	0

SOURCE ID: ODORCNT

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	16.6,	205.5,	0	2	16.6,	199.8,	0	3	16.6,	188.0,	0	4	16.6,	170.5,	0	5	16.6,	147.9,	0	6	16.6,	120.7,	0
7	16.6,	89.8,	0	8	16.6,	56.3,	0	9	0.0,	0.0,	0	10	0.0,	0.0,	0	11	16.6,	86.1,	0	12	16.6,	117.2,	0
13	16.6,	144.8,	0	14	16.6,	168.0,	0	15	16.6,	186.0,	0	16	16.6,	198.4,	0	17	16.6,	204.8,	0	18	16.6,	205.0,	0
19	16.6,	205.5,	0	20	16.6,	199.8,	0	21	16.6,	188.0,	0	22	16.6,	170.5,	0	23	38.0,	73.4,	0	24	38.0,	75.8,	0
25	38.0,	75.8,	0	26	38.0,	73.5,	0	27	38.0,	69.0,	0	28	0.0,	0.0,	0	29	16.6,	86.1,	0	30	16.6,	117.2,	0
31	16.6,	144.8,	0	32	16.6,	168.0,	0	33	16.6,	186.0,	0	34	16.6,	198.4,	0	35	16.6,	204.8,	0	36	16.6,	205.0,	0

*** ISCST3 - VERSION 02035 ***

*** Potrero Units 7 and 8 Includes Cooling Tower
*** HRA

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**MODELOPTs:
CONC

URBAN ELEV

GRDRIS

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS) RESULTS ***

** CONC OF XQ IN MICROGRAMS/M**3

**

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
1	1ST HIGHEST VALUE IS	26.87925	AT (554608.00,	4178792.00,	0.40,	0.00) DC NA
	2ND HIGHEST VALUE IS	26.25821	AT (554633.00,	4178792.00,	0.00,	0.00) DC NA
	3RD HIGHEST VALUE IS	26.00610	AT (554633.00,	4178767.00,	0.00,	0.00) DC NA
	4TH HIGHEST VALUE IS	25.94031	AT (554599.00,	4178770.00,	0.60,	0.00) DC NA
	5TH HIGHEST VALUE IS	25.44065	AT (554599.00,	4178795.00,	0.60,	0.00) DC NA
	6TH HIGHEST VALUE IS	24.66989	AT (554608.00,	4178767.00,	0.40,	0.00) DC NA
	7TH HIGHEST VALUE IS	24.06681	AT (554658.00,	4178792.00,	0.00,	0.00) DC NA
	8TH HIGHEST VALUE IS	22.36058	AT (554658.00,	4178817.00,	0.00,	0.00) DC NA
	9TH HIGHEST VALUE IS	22.06079	AT (554658.00,	4178767.00,	0.00,	0.00) DC NA
	10TH HIGHEST VALUE IS	22.01640	AT (554633.00,	4178817.00,	0.00,	0.00) DC NA
2	1ST HIGHEST VALUE IS	42.20484	AT (554599.00,	4178820.00,	0.60,	0.00) DC NA
	2ND HIGHEST VALUE IS	38.63365	AT (554608.00,	4178817.00,	0.40,	0.00) DC NA
	3RD HIGHEST VALUE IS	38.13252	AT (554441.00,	4178695.00,	2.00,	0.00) DC NA
	4TH HIGHEST VALUE IS	37.02274	AT (554599.00,	4178795.00,	0.60,	0.00) DC NA
	5TH HIGHEST VALUE IS	34.95521	AT (554608.00,	4178842.00,	0.00,	0.00) DC NA
	6TH HIGHEST VALUE IS	34.47420	AT (554599.00,	4178847.00,	0.10,	0.00) DC NA
	7TH HIGHEST VALUE IS	32.43603	AT (554616.00,	4178847.00,	0.00,	0.00) DC NA
	8TH HIGHEST VALUE IS	31.98240	AT (554416.00,	4178695.00,	2.10,	0.00) DC NA
	9TH HIGHEST VALUE IS	31.90977	AT (554608.00,	4178792.00,	0.40,	0.00) DC NA
	10TH HIGHEST VALUE IS	30.54140	AT (554633.00,	4178842.00,	0.00,	0.00) DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF XQ IN MICROGRAMS/M**3

**

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
1	HIGH 1ST HIGH VALUE IS	407.63910	ON 92030624:	AT (554283.00,	4178642.00,	5.70,
	HIGH 2ND HIGH VALUE IS	378.71396	ON 92020323:	AT (554283.00,	4178642.00,	5.70,
						0.00) DC NA
2	HIGH 1ST HIGH VALUE IS	1420.70264	ON 92100708:	AT (554441.00,	4178695.00,	2.00,
	HIGH 2ND HIGH VALUE IS	1400.81653	ON 92111423:	AT (554441.00,	4178695.00,	2.00,
						0.00) DC NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

C3 ACE 2588 MODEL OUTPUT (EXCERPTS)

***** A C E 2 5 8 8 --- ASSESSMENT OF CHEMICAL EXPOSURE FOR AB 2588 --- VERSION 93288 *****

*** A MULTI-SOURCE, MULTI-POLLUTANT, MULTI-PATHWAY RISK ASSESSMENT MODEL

DEVELOPED BY APPLIED MODELING INC. AND SANTA BARBARA COUNTY APCD ***

Distributed and Maintained by CAPCOA

*** INPUT MODELING PARAMETERS ***

DISPERSION MODELING OPTION = 1
RISK ASSESSMENT OPTION = 0
NONCANCER ACUTE OPTION = 1
DIAGNOSTIC PRINT OUTPUT OPTION = 1
NUMBER OF RECEPTORS = 2267
NUMBER OF SOURCES = 2
NUMBER OF POLLUTANTS = 25
NUMBER OF DISPERSION MODELING HOURS = 8784
NUMBER OF DISPERSION MODELING DAYS = 366

IDODIS = 1 ==> ISCST DISPERSION MODELING WITH SEQUENTIAL METEOROLOGY
ANNUAL CONCENTRATIONS COMPUTED AS AVERAGES OF 1-HOUR CONC.

IDORISK = 0 ==> FULL MODEL RUN FOR RISK ASSESSMENT FROM ALL SOURCES AT ALL RECEPTORS

IDOACU = 1 ==> NONCANCER ACUTE EXPOSURE PERFORMED

IDOPRT = 1 ==> DIAGNOSTIC PRINT OUTPUT CREATED

IDENTIFICATION NUMBERS OF MODELED POLLUTANTS:

1	9	13	20	30	36	38	70	83	87	91	96	110	111	122
130	134	135	137	145	151	152	167	168	194					

*** POLLUTANT-SPECIFIC DATA ***

NAME	SYMBOL	NUM	UNIT RISK	POTENCY	ACUTE AEL	CHRONIC AEL	ORAL DOSE	CHRONIC TOX ENDPOINTS								ACUTE TOX ENDPOINTS							
			(ug/m3)-1	(mg/kg-d)-1	(ug/m3)	(ug/m3)	(mg/kg-d)	CV	CN	IM	KI	LI	RP	RE	SK	CV	CN	IM	KI	LI	RP	RE	EY
Acetaldehyde	ACETA	1	2.70E-06	0.00E+00	3.60E+04	9.00E+00	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Ammonia	NH3	9	0.00E+00	0.00E+00	3.20E+03	2.00E+02	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Benzene	BENZE	13	2.90E-05	0.00E+00	1.30E+03	6.00E+01	0.00E+00	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Butadiene-1,3	BUTAD	20	1.70E-04	0.00E+00	2.20E+02	2.00E+01	0.00E+00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
Chloroform	CHCL3	30	5.30E-06	0.00E+00	1.50E+02	3.00E+02	0.00E+00	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0
Chromium (hex.)	Cr	36	1.50E-01	4.20E-01	1.00E-01	2.00E-01	2.00E-02	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Copper	Cu	38	0.00E+00	0.00E+00	1.00E+02	2.40E+00	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
Formaldehyde	HCHO	70	6.00E-06	0.00E+00	9.40E+01	3.00E+00	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Lead	Pb	83	1.20E-05	8.50E-03	6.00E+00	1.50E+00	0.00E+00	1	1	1	1	0	1	0	0	1	1	1	1	0	1	0	1
Mercury	Hg	87	0.00E+00	0.00E+00	1.80E+00	9.00E-02	3.00E-04	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Methyl chloroform	TCA11	91	0.00E+00	0.00E+00	6.80E+04	1.00E+03	0.00E+00	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Methylene chloride	METCL	96	1.00E-06	0.00E+00	1.40E+04	4.00E+02	0.00E+00	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Naphthalene	NAPTH	110	0.00E+00	0.00E+00	5.00E+03	9.00E+00	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Nickel	Ni	111	2.60E-04	0.00E+00	6.00E+00	5.00E-02	5.00E-02	1	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0
Perchloroethylene	PCE	122	5.90E-06	0.00E+00	2.00E+04	3.50E+01	0.00E+00	0	0	0	1	1	0	0	0	0	1	0	0	0	0	1	1
Benzo(A)Pyrene	PAH	130	1.10E-03	1.20E+01	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Propylene	PROPL	134	0.00E+00	0.00E+00	0.00E+00	3.00E+03	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Propylene oxide	PROX	135	3.70E-06	0.00E+00	3.10E+03	3.00E+01	0.00E+00	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1
Selenium	Se	137	0.00E+00	0.00E+00	2.00E+01	2.00E+01	0.00E+00	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	1
Toluene	TOL	145	0.00E+00	0.00E+00	3.70E+04	3.00E+02	0.00E+00	0	1	0	0	0	1	1	0	0	1	0	0	0	0	1	1
Xylene	XYLEN	151	0.00E+00	0.00E+00	2.20E+04	7.00E+02	0.00E+00	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Zinc	Zn	152	0.00E+00	0.00E+00	5.00E+01	3.50E+01	0.00E+00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0
Ethyl Benzene	ETHBE	167	0.00E+00	0.00E+00	4.34E+04	2.00E+03	0.00E+00	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1
Hexane	HEXNE	168	0.00E+00	0.00E+00	0.00E+00	7.00E+03	0.00E+00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MethylEthelKetone	MEK	194	0.00E+00	0.00E+00	1.30E+04	1.00E+03	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

TOTAL NUMBER OF MODELED POLLUTANTS = 25

NUMBER OF CARCINOGENIC POLLUTANTS = 12

1 13 20 30 36 70 83 96 111 122
 130 135

NUMBER OF MULTIPATHWAY POLLUTANTS = 5

36 83 87 111 130

NUMBER OF POLLUTANTS WITH ACUTE NON-CANCER RISK = 22

1 9 13 20 30 36 38 70 83 87
 91 96 110 111 122 135 137 145 151 152
 167 194

MAXIMUM NUMBER OF ACUTE TOXICOLOGICAL ENDPOINTS = 6

NUMBER OF POLLUTANTS WITH CHRONIC NON-CANCER RISK = 24

1 9 13 20 30 36 38 70 83 87
 91 96 110 111 122 134 135 137 145 151
 152 167 168 194

MAXIMUM NUMBER OF CHRONIC TOXICOLOGICAL ENDPOINTS = 5

REQUIRED TOTAL ARRAY SIZE = 340996 WORDS

*** INPUT SOURCE EMISSION RATES ***

FOR SOURCE # 1 0 CT CELLS 1-14
OPERATING HOURS = 8784.00 SURFACE AREA (m2) = 1.000E+00 DEPOSITION ADJUST. FACTOR = 1.00000

POLLUTANT NAME	POLLUTANT NUMBER	1-HOUR RATE		ANNUAL RATE	
		(g/s)	(lb/hr)	(g/s)	(lb/yr)
ACETA	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NH3	9	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BENZE	13	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BUTAD	20	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CHCL3	30	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cr	36	2.050E-08	1.627E-07	2.050E-08	1.429E-03
Cu	38	2.290E-07	1.817E-06	2.290E-07	1.596E-02
HCHO	70	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb	83	2.950E-10	2.341E-09	2.950E-10	2.057E-05
Hg	87	6.160E-08	4.889E-07	6.160E-08	4.294E-03
TCA11	91	0.000E+00	0.000E+00	0.000E+00	0.000E+00
METCL	96	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NAPTH	110	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni	111	3.950E-08	3.135E-07	3.950E-08	2.754E-03
PCE	122	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PAH	130	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PROPL	134	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PROX	135	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Se	137	7.900E-09	6.270E-08	7.900E-09	5.507E-04
TOL	145	0.000E+00	0.000E+00	0.000E+00	0.000E+00
XYLEN	151	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Zn	152	9.860E-07	7.825E-06	9.860E-07	6.874E-02
ETHBE	167	0.000E+00	0.000E+00	0.000E+00	0.000E+00
HEXNE	168	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEK	194	0.000E+00	0.000E+00	0.000E+00	0.000E+00

FOR SOURCE # 2 0 ODOR CONTROL
OPERATING HOURS = 8784.00 SURFACE AREA (m2) = 1.000E+00 DEPOSITION ADJUST. FACTOR = 1.00000

POLLUTANT NAME	POLLUTANT NUMBER	1-HOUR RATE		ANNUAL RATE	
		(g/s)	(lb/hr)	(g/s)	(lb/yr)
ACETA	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NH3	9	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BENZE	13	5.750E-05	4.563E-04	5.750E-05	4.009E+00
BUTAD	20	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CHCL3	30	1.590E-04	1.262E-03	1.590E-04	1.108E+01

*** INPUT FACILITY-WIDE EMISSION RATES ***

POLLUTANT NAME	POLLUTANT NUMBER	1-HOUR RATE		ANNUAL RATE	
		(g/s)	(lb/hr)	(g/s)	(lb/yr)
ACETA	1	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NH3	9	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BENZE	13	5.750E-05	4.563E-04	5.750E-05	4.009E+00
BUTAD	20	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CHCl3	30	1.590E-04	1.262E-03	1.590E-04	1.108E+01
Cr	36	2.050E-08	1.627E-07	2.050E-08	1.429E-03
Cu	38	2.290E-07	1.817E-06	2.290E-07	1.596E-02
HCHO	70	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb	83	2.950E-10	2.341E-09	2.950E-10	2.057E-05
Hg	87	6.160E-08	4.889E-07	6.160E-08	4.294E-03
TCA11	91	2.200E-04	1.746E-03	2.200E-04	1.534E+01
METCL	96	1.450E-04	1.151E-03	1.450E-04	1.011E+01
NAPTH	110	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni	111	3.950E-08	3.135E-07	3.950E-08	2.754E-03
PCE	122	2.880E-04	2.286E-03	2.880E-04	2.008E+01
PAH	130	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PROPL	134	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PROX	135	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Se	137	7.900E-09	6.270E-08	7.900E-09	5.507E-04
TOL	145	2.470E-04	1.960E-03	2.470E-04	1.722E+01
XYLEN	151	2.370E-04	1.881E-03	2.370E-04	1.652E+01
Zn	152	9.860E-07	7.825E-06	9.860E-07	6.874E-02
ETHBE	167	4.060E-05	3.222E-04	4.060E-05	2.830E+00
HEXNE	168	0.000E+00	0.000E+00	0.000E+00	0.000E+00
MEK	194	2.170E-07	1.722E-06	2.170E-07	1.513E-02

*** 70-YEAR LIFETIME CANCER RISK BY SOURCE FOR PEAK RECEPTOR # 27 ***

SOURCE	INHALE	DERMAL	SOIL	WATER	PLANTS	ANIMAL	MOTHER MILK	SUM
1	5.725E-08	8.798E-11	4.158E-10	0.000E+00	1.683E-10	0.000E+00	0.000E+00	5.792E-08
2	1.838E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.838E-07
SUM	2.410E-07	8.798E-11	4.158E-10	0.000E+00	1.683E-10	0.000E+00	0.000E+00	2.417E-07

RECEPTOR RISK OF 2.417E-07 IS BELOW SIGNIFICANT RISK LEVEL OF 1.000E-05

RECEPTOR RISK OF 2.417E-07 IS BELOW IMPACT ZONE RISK LEVEL OF 1.000E-06

*** 70-YEAR LIFETIME CANCER RISK BY POLLUTANT FOR PEAK RECEPTOR # 27 ***

POLLUTANT	INHALE	DERMAL	SOIL	WATER	PLANTS	ANIMAL	MOTHER MILK	SUM
ACETA	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BENZE	7.038E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.038E-08
BUTAD	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
CHCL3	3.557E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.557E-08
Cr	5.706E-08	8.798E-11	4.157E-10	0.000E+00	1.683E-10	0.000E+00	0.000E+00	5.773E-08
HCHO	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb	6.568E-14	2.562E-15	1.211E-13	0.000E+00	5.084E-14	0.000E+00	0.000E+00	2.402E-13
METCL	6.120E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.120E-09
Ni	1.906E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.906E-10
PCE	7.171E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.171E-08
PAH	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
PROX	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
SUM	2.410E-07	8.798E-11	4.158E-10	0.000E+00	1.683E-10	0.000E+00	0.000E+00	2.417E-07

RECEPTOR RISK OF 2.417E-07 IS BELOW SIGNIFICANT RISK LEVEL OF 1.000E-05

RECEPTOR RISK OF 2.417E-07 IS BELOW IMPACT ZONE RISK LEVEL OF 1.000E-06

*** MAXIMUM ACUTE HAZARD INDEX BY POLLUTANT ***

POLLUTANT	PEAK CONC (ug/m3)	BACKGR (ug/m3)	TOTAL (ug/m3)	AEL (ug/m3)	HAZARD INDEX	RECEPTOR
ACETA	0.000E+00	0.000E+00	0.000E+00	3.600E+04	0.000E+00	0
NH3	0.000E+00	0.000E+00	0.000E+00	3.200E+03	0.000E+00	0
BENZE	8.169E-02	0.000E+00	8.169E-02	1.300E+03	6.284E-05	15
BUTAD	0.000E+00	0.000E+00	0.000E+00	2.200E+02	0.000E+00	0
CHCL3	2.259E-01	0.000E+00	2.259E-01	1.500E+02	1.506E-03	15
Cr	8.357E-06	0.000E+00	8.357E-06	1.000E-01	8.357E-05	93
Cu	9.335E-05	0.000E+00	9.335E-05	1.000E+02	9.335E-07	93
HCHO	0.000E+00	0.000E+00	0.000E+00	9.400E+01	0.000E+00	0
Pb	1.203E-07	0.000E+00	1.203E-07	6.000E+00	2.004E-08	93
Hg	2.511E-05	0.000E+00	2.511E-05	1.800E+00	1.395E-05	93
TCA11	3.126E-01	0.000E+00	3.126E-01	6.800E+04	4.596E-06	15
METCL	2.060E-01	0.000E+00	2.060E-01	1.400E+04	1.471E-05	15
NAPTH	0.000E+00	0.000E+00	0.000E+00	5.000E+03	0.000E+00	0
Ni	1.610E-05	0.000E+00	1.610E-05	6.000E+00	2.684E-06	93
PCE	4.092E-01	0.000E+00	4.092E-01	2.000E+04	2.046E-05	15
PROX	0.000E+00	0.000E+00	0.000E+00	3.100E+03	0.000E+00	0
Se	3.220E-06	0.000E+00	3.220E-06	2.000E+01	1.610E-07	93
TOL	3.509E-01	0.000E+00	3.509E-01	3.700E+04	9.484E-06	15
XYLEN	3.367E-01	0.000E+00	3.367E-01	2.200E+04	1.530E-05	15
Zn	4.019E-04	0.000E+00	4.019E-04	5.000E+01	8.039E-06	93
ETHBE	5.768E-02	0.000E+00	5.768E-02	4.340E+04	1.329E-06	15
MEK	3.083E-04	0.000E+00	3.083E-04	1.300E+04	2.371E-08	15

*** MAXIMUM CHRONIC EXPOSURE BY POLLUTANT FROM ALL SOURCES ***

*****PATHWAY DOSE (mg/kg-d)*****														
POL.	INHALE	DERMAL	SOIL	WATER	PLANTS	ANIMAL	MOT MILK	NON-INH	ACCEPTABL	INH CONC	BACKGR	AEL	HAZARD	REC.
								DOSE SUM	ORAL DOSE	(ug/m3)	(ug/m3)	(ug/m3)	INDEX	
ACETA	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E+00	0.00E+00	0
NH3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+02	0.00E+00	0
BENZE	6.93E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.43E-03	0.00E+00	6.00E+01	4.04E-05	27
BUTAD	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+01	0.00E+00	0
CHCl3	1.92E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.71E-03	0.00E+00	3.00E+02	2.24E-05	27
Cr	1.57E-10	3.03E-10	1.43E-09	0.00E+00	5.80E-10	0.00E+00	0.00E+00	2.32E-09	2.00E-02	5.51E-07	0.00E+00	2.00E-01	2.87E-06	173
Cu	1.76E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.16E-06	0.00E+00	2.40E+00	2.56E-06	173
HCHO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+00	0.00E+00	0
Pb	2.27E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.93E-09	0.00E+00	1.50E+00	5.29E-09	173
Hg	4.73E-10	9.12E-10	4.31E-09	0.00E+00	5.92E-09	0.00E+00	0.00E+00	1.11E-08	3.00E-04	1.66E-06	0.00E+00	9.00E-02	5.55E-05	173
TCA11	2.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.29E-03	0.00E+00	1.00E+03	9.29E-06	27
METCL	1.75E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E-03	0.00E+00	4.00E+02	1.53E-05	27
NAPTH	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.00E+00	0.00E+00	0
Ni	3.03E-10	2.34E-09	2.76E-09	0.00E+00	1.89E-09	0.00E+00	0.00E+00	6.99E-09	5.00E-02	1.06E-06	0.00E+00	5.00E-02	2.14E-05	173
PCE	3.47E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-02	0.00E+00	3.50E+01	3.47E-04	27
PROPL	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+03	0.00E+00	0
PROX	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.00E+01	0.00E+00	0
Se	6.07E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-07	0.00E+00	2.00E+01	1.06E-08	173
TOL	2.98E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-02	0.00E+00	3.00E+02	3.47E-05	27
XYLEN	2.86E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-02	0.00E+00	7.00E+02	1.43E-05	27
Zn	7.57E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.65E-05	0.00E+00	3.50E+01	7.57E-07	173
ETHBE	4.90E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-03	0.00E+00	2.00E+03	8.57E-07	27
HEXNE	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+03	0.00E+00	0
MEK	2.62E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.16E-06	0.00E+00	1.00E+03	9.16E-09	27

*** SUMMARY OF MAXIMUM PREDICTED RISKS ***

CANCER RISK ASSESSMENT

SIGNIFICANT RISK LEVEL = 1.000E-05
IMPACT ZONE RISK LEVEL = 1.000E-06
MAXIMUM PEAK RISK = 2.417E-07
PREDICTED AT RECEPTOR # 27
TOTAL EXCESS BURDEN = 0.000E+00

0 RECEPTORS WITH RISK EXCEEDING SIGNIFICANT RISK LEVEL OF 1.000E-05

ACUTE EXPOSURE TO NON-CANCER POLLUTANTS

SIGNIFICANT HAZARD INDEX = 1.0000
MAXIMUM HAZARD INDEX FOR AN ENDPOINT = 0.0016
PREDICTED AT RECEPTOR # 15

0 RECEPTORS WITH HAZARD INDEX .GE. 1.0000 FOR ONE OR MORE TOXICOLOGICAL ENDPOINTS

CHRONIC EXPOSURE TO NON-CANCER POLLUTANTS

SIGNIFICANT HAZARD INDEX = 1.0000
MAXIMUM HAZARD INDEX FOR AN ENDPOINT = 0.0004
PREDICTED AT RECEPTOR # 27

0 RECEPTORS WITH HAZARD INDEX .GE. 1.0000 FOR ONE OR MORE TOXICOLOGICAL ENDPOINTS